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GENERAL ELECTROMAGNETIC MODEL FOR THE ANALYSIS OF COMPLEX SYSTEMS (GEMACS) Computer Code Documentation (Version 3)

The BDM Corporation

Dr. Diana L. Kadlec and Dr. E. L. Coffey

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ROME AIR DEVELOPMENT CENTER Air Force Systems Command Griffiss Air Force Base, NY 13441



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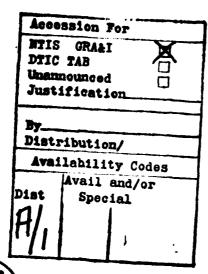
SECURITY CLASSIFICATION OF THIS PAGE(When Date Entered)

large object problems and combination sized object problems.

Volume I of this report is the User Manual. The code execution requirements, input language and output are discussed.

Volume II is the Engineering Manual. The theory and engineering approximations implemented in the code are discussed. Modeling criterion are given.

Volume III is the Computer Code Documentation Manual. This manual contains extensive software information of the code.



- 1. NAME: UNEFLD (MOM)
- 2. PURPOSE: To calculate the electric field due to the unit currents in the $\hat{\tau}_1$ and $\hat{\tau}_2$ directions on the source patch.
- 3. METHOD: The electric field at a segment observation point due to the source patch j is given by

$$\begin{split} \vec{E}(\vec{r}_{o}) &= \frac{-jnA}{4\pi k} \left[\left(\frac{-1 - jkR + k^{2}R^{2}}{R^{3}} \right) \vec{J}_{j} \right. \\ &\left. + \left(\frac{3 + 3jkR - k^{2}R^{2}}{R^{5}} \right) \left(\vec{J}_{j} \cdot \vec{R} \right) \vec{R} \right] e^{-jkR} \end{split}$$

where $\bar{J}_j = J_{1j} \hat{t}_{1j} + J_{2j}\hat{t}_{2j}$, R is the vector from the source to the observation point, and A is the area of the patch. In this subroutine J_{1j} and J_{2j} are unity.

4. INTERNAL VARIABLES:

| VARIABLE | DEFINITION |
|----------|--------------|
| AUNTURE | OFI THT LTON |

AREA The area of the source patch

CONST $\eta/4\pi k$

EXIT1,EYIT1,EZIT1 Imaginary and real part of the electric field at the observation segment due to a current in the \hat{t}_1 direction on the source

patch

EXIT2, EYIT2 Imaginary and real part of the electric EXRT2, EYRT2, EZRT2 field at the observation segment due to a current in the $\hat{\tau}_2$ direction on the source

patch

R The distance from the source patch to the

observation segment

RJ1 $J_1 \hat{t}_1 \cdot \bar{R}$

RJ2 $J_2 \hat{t}_2 \cdot R$

RK kR

R2 R2

k2R2 R2K

R3 R3

R5 R5

TCR,TCI Real and imaginary parts of

 $\frac{-\eta A}{4\pi k} e^{-jkR}$

TIR, TII Real and imaginary parts of

 $(-1 - jkR + R^2k^2)/R^3$

T2R, T21 Real and imaginary parts of

 $(3 + 3jkR - k^2R^2)/R^5$

T1,T2,T3,T4 Temporary variables used in computing elec-

tric field

T1XJ,T1YJ,T1ZJ X,Y, and Z components of \hat{t}_1

T2XJ,T2YJ,T2ZJ X.Y. and Z components of \hat{t}_2

XIJ,YIJ,ZIJ X.Y. and Z components of vector from source

patch to observation segment

I/O VARIABLES

INPUT LOCATION

> AREA /AMPZIJ/

> ETA /AMPZIJ/

> T1XJ,T1YJ,T1ZJ /AMPZIJ/

> T2XJ,T2YJ,T2ZJ /AMPZIJ/

> TWOPI /AMPZIJ/

> WAVNUM /AMPZIJ/

XIJ, YIJ, ZIJ F.P.

OUTPUT LOCATION EXIT1,EYIT1,EZIT1 /AMPZIJ/
EXIT2,EYIT2,EZIT2 /AMPZIJ/
EXRT1,EYRT1,EZRT1 /AMPZIJ/
EXRT2,EYRT2,EZRT2 /AMPZIJ/

6. CALLING ROUTINES:

NTRPLU

WYRPAT

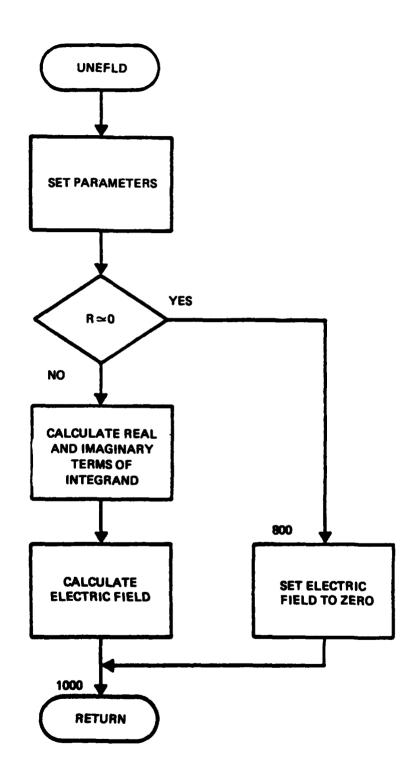
7. CALLED ROUTINES:

ASSIGN

STATIN

STATOT

WLKBCK



- 1. NAME: UNHFLD (MOM)
- 2. PURPOSE: To calculate the magnetic field due to a unit current in the \hat{t}_1 and \hat{t}_2 directions on the patch source.
- 3. METHOD: The magnetic field is calculated at a patch observation point due to the unit currents on a patch source j. The magnetic field is given by

$$\bar{H}(\bar{r}) = \frac{-A}{4\pi} \left[\left(1 + jkR \right) \frac{e^{-jkR}}{R^3} \right] \left[\bar{R} \times \bar{J}_j \right]$$

where \bar{R} is the vector from the source to the observation point and A is the area of the source patch. This expression treats the surface currents as lumped at the center of the patch. \bar{H} is computed in the direction of the vectors \hat{t}_1 and \hat{t}_2 .

4. INTERNAL VARIABLES:

VARIABLE

DEFINITION

AREA

The area of the source patch

CRK

cos (kR)

EXIT1, EYIT1, EZIT1 EXRT1, EYRT1, EZRT1

Imaginary and real part of magnetic field at an observation patch due to current in the $\hat{\tau}_1$ direction on source patch

EXIT2, EYIT2, EZIT2 EXRT2, EYRT2, EZRT2

Imaginary and real part of magnetic field at an observation patch due to current in the $\hat{\tau}_2$ direction on source patch

R

The magnitude of the vector from the source patch to the observation patch

RK

kR

R2

R2

R3

R3

SRK

sin (kR)

TI,TR

Imaginary and real part of

$$\frac{-A}{4\pi} \left[(1 + jkR) \frac{e^{-jkR}}{R^3} \right]$$

UNHFLD (MOM)

TIX,TIY,TIZ Temporary variables used in computing the TRX,TRY,TRZ magnetic field

T1XJ,T1YJ,T1ZJ X,Y, and Z components of \hat{t}_1

T2XJ, T2YJ, T2ZJ X, Y, and Z components of \hat{t}_2

XIJ, YIJ, ZIJ X, Y, and Z components of vector from source

patch to observation patch

5. I/O VARIABLES:

A. INPUT LOCATION

AREA /AMPZIJ/

T1XJ,T1YJ,T1ZJ /AMPZIJ/

T2XJ,T2YJ,T2ZJ /AMPZIJ/

TWOPI /AMPZIJ/

WAVNUM /AMPZIJ/

XIJ,YIJ,ZIJ F.P.

B. OUTPUT LOCATION

EXIT1, EYIT1, EZIT1 /AMPZIJ/

EXIT2, EYIT2, EZIT2 /AMPZIJ/

EXRT1, EYRT1, EZRT1 /AMPZIJ/

EXRT2, EYRT2, EZRT2 /AMPZIJ/

6. CALLING ROUTINE:

NTRPLU

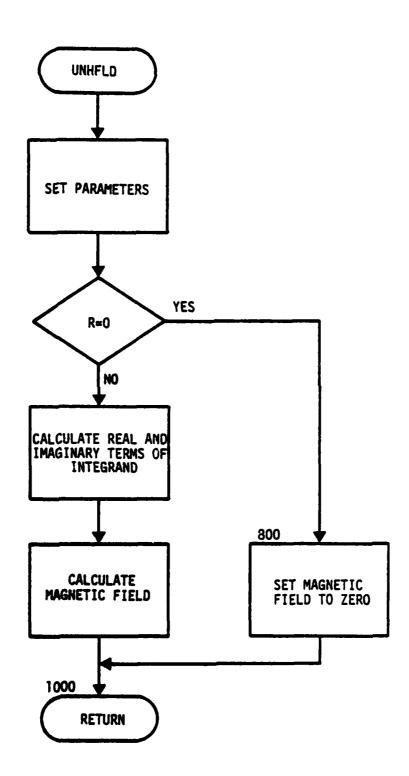
7. CALLED ROUTINES:

ASSIGN

STATIN

STATOT

WLKBCK



1. NAME: WLKBCK (GTD, INPUT, MOM, OUTPUT)

2. PURPOSE: To accumulate the walkback table information.

3. METHOD: The subroutine accumulates a table of the subroutine linkage to the current position. If the name of the subroutine called through the argument is the same as the last name in the table, it is removed from the table. If it is not the same as the last name, it is entered into the last position of the table and the table pointer is incremented by 1.

4. INTERNAL VARIABLES:

VARIABLE

DEFINITION

IBLKL

A blank field

MXWALK

Maximum number of entries in walkback table

NAMSB

Input argument, coded name of subroutine

being entered or exited

5. I/O VARIABLES:

A. INPUT

LOCATION

LUPRNT

/ADEBUG/

MXWALK

/ADEBUG/

NAMRTN

/ADEBUG/

NAMSB

F.P.

B. OUTPUT

LOCATION

INDXWB

/ADEBUG/

NAMRTH

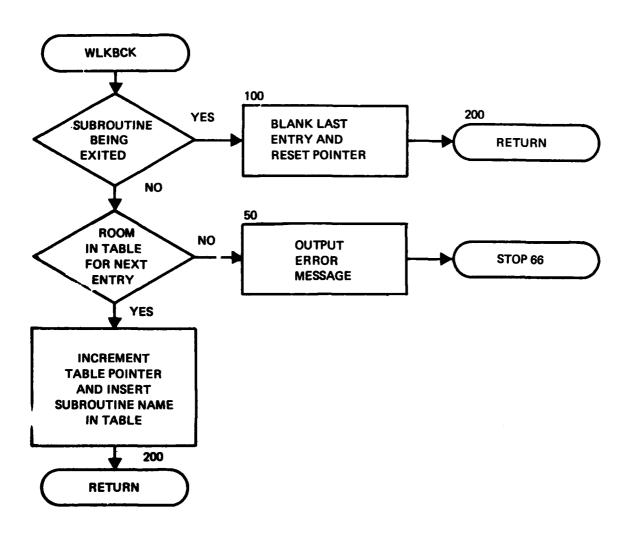
/ADEBUG/

6. CALLING ROUTINES:

All major routines.

7. CALLED ROUTINES:

TRCEBK



CONTRACT CONTRACT

- 1. NAME: WRTCHK (GTD, INPUT, MOM, OUTPUT)
- 2. PURPOSE: Write the information needed for a checkpoint or end-of-module restart file.
- 3. METHOD: The common areas specified in the RWCOMS routine are written to the IOCKPT logical unit. After this is completed, the peripheral files which are currently open are rewound and written out to the IOCKPT file.
- 4. INTERNAL VARIABLES:

VARIABLE DEFINITION

DT Elapsed time between calls to TICHEK

FSTCHK Flag indicating if first checkpoint on

ICKFIL

ICKFIL Checkpoint file number

NREAD Flag to tell RWCOMS to write common areas

to IOCKPT

Time that the checkpoint is being taken

5. I/O VARIABLES:

A. INPUT LOCATION

CPFRWD /SYSFIL/

IMDCHK /ADEBUG/

IOCKPT /SYSFIL/

IOFILE /IOFLES/

ISOFF /ADEBUG/

ISON /ADEBUG/

LUPRNT /ADEBUG/

MODCHK /SYSFIL/

NDATBL /PARTAB/

NPDATA /PARTAB/

WRTCHK (GTD, INPUT, MOM, OUTPUT)

B. OUTPUT LOCATION

CHKWRT /SYSFIL/

IWRTCK /ADEBUG/

NUMCHK /SYSFIL/

6. CALLING ROUTINES*:

ERROR (1,2,3,4)

SOLDRY (3)

STATFN (1,2,3,4)

SYSCHK (1,2,3,4)

TSKXQT (2,3,4)

7. CALLED ROUTINES:

ASSIGN RWFILS

CLSFIL STATIN

GETSYM STATOT

OPNFIL TICHEK

PUTSYM WLKBCK

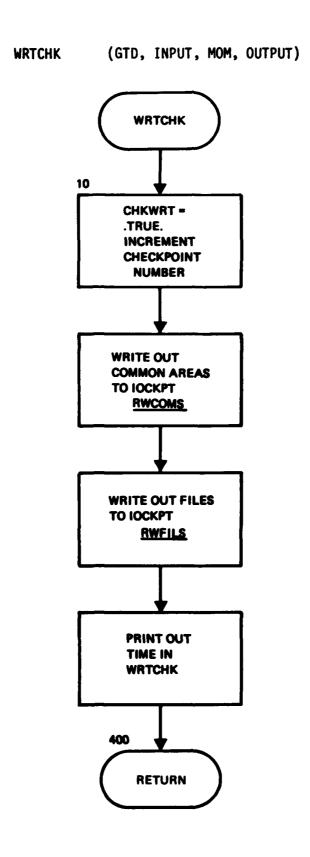
RNCOMS WRTFIL

*1-INPUT

2-GTD

3-MOM

4-OUTPUT



- 1. WRTFIL (GTD, INPUT, MOM, OUTPUT)
- 2. PURPOSE: Central output routine for all peripheral files.
- 3. METHOD: The data called through the input argument list are transfered to the logical unit specified using a FORTRAN binary write. The position of the file is incremented by the number of words written to the file and if the file has been extended, the end of file flag is extended to point to the total number of words which have been written.
- 4. INTERNAL VARIABLES:

VARIABLE

DEFINITION

LUNIT

STATE STATE OF THE STATE OF THE

Input argument designating logical unit

NWORDS

Input argument specifying number of computer words to be written to the designated

logical unit

XWORDS

Input argument array containing the data to

be written to the specified logical unit

5. I/O VARIABLES:

A. INPUT

LOCATION

DBGPRT

/ADEBUG/

IOFILE

/IOFLES/

ISON

/ADEBUG/

LUNIT

F.P.

LUPRNT

/ADEBUG/

NWORDS

F.P.

XWORDS

F.P.

B. OUTPUT

LOCATION

IERRF

/ADEBUG/

IOFILE

/IOFLES/

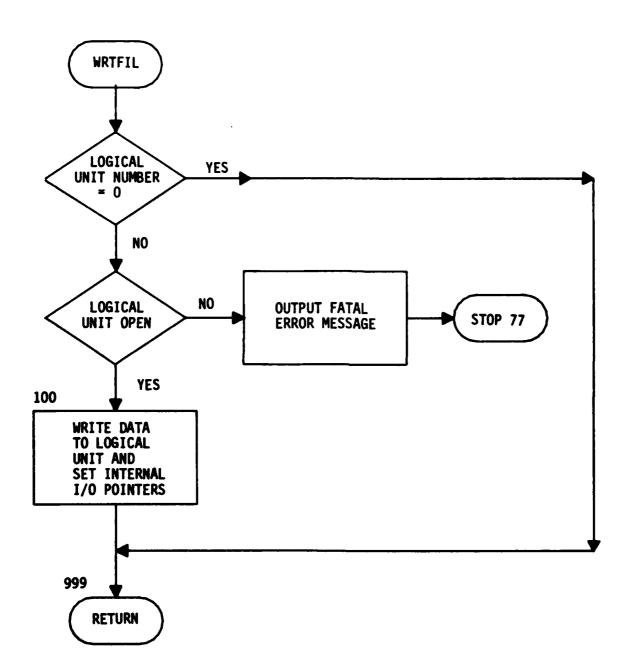
NDFILE

/IOFLES/

- **CALLING ROUTINES*:**
 - BUBBLE (1)
 - DECOMP (3)
 - GEODRV (1)
 - PRTSYM (3)
 - PUTSYM (1,2,3,4)
 - RWCOMS (1,2,3,4)
 - RWFILS (1,2,3,4)
 - SOLDRY (3)
 - SUBPAT (1)
 - WRTCHK (1,2,3,4)
- CALLED ROUTINES: 7.
 - **ASSIGN**
 - **ERROR**
 - STATIN
 - **STATOT**
 - **WLKBCK**

- *1-INPUT
- 2-GTD
- 3-MOM 4-OUTPUT

WRTFIL (GTD, INPUT, MOM, OUTPUT)



- 1. NAME: WYRDRY (INPUT)
- 2. PURPOSE: Processes the user-format MOM and GTD geometry objects and macro-object generation commands to generate, coordinate and orient angles for all wire segments, patches, plates, cylinders, and end caps desired in the geometry.
- 3. METHOD: WYRDRV calls subroutine SCAN to read a geometry data set card. SCAN returns the card's data in VAL and NVAL. The first item is checked against the set of geometry mnemonics, and a branch is made to that portion of the code which handles the mnemonic. The geometry data set cards are read in sequence by SCAN until an END card is encountered.

The geometry objects presently implemented (with mnemonic in parenthesis) are point (PT), wire (WR), patch (PA), plate (PL), cylinder (CY), and end cap (EC). Wire segments may also be created with the connect point (CP) and multiple point (MP) commands. Wire radii are specified on the radius (RA) card.

Commands available for scaling, coordinate transformation, and symmetry are coordinate system (CS), scale (SC), plane symmetry (PSYM) and rotational symmetry (RSYM). Segments may be renumbered with the renumber (RN) command.

Macro-geometry elements may be created with the define element (DF) and define end (DE) commands.

Individual objects or macro-elements may be replicated by using the translation (XL), rotation (RX, RY, RZ), and reflect (RF) commands. A macro-element may be assigned a different coordinate system with the attach (AT) command.

Details on the use of these geometry commands may be found in the GEMACS User Manual.

4. INTERNAL VARIABLES:

| VARIABLE | DEFINITION | |
|----------|---------------------------------|--|
| DX | Segment length in x direction | |
| DY | Segment length in y direction | |
| DZ | Segment length in z direction | |
| ERRMSG | Array containing error messages | |
| FJS | Number of segments on a wire | |

IADD Integer number of additional objects to be

generated in a translation

IARG Index to the scan tables

IARGS Number of arguments

ICS Index to coordinate system in which a given

operation is desired

ICSSAV Saves the ICS index

ICSYS Last used coordinate system index

IC1 The old coordinate system

IC2 The new coordinate system

IFOUND Flag indicating defined element found

ILIM Limit to IDEFIN array

IMN Temporary variable

INCTAG=INCTG Tag increment number for new segments

INP Number of points to be multiply connected

INPP3 INP + 3

INPP4 INP + 4

INPPS INP + 5

IPL User-assigned plate number

IPL1 Plate number of plate created by macro-

geometry command

IPT Geometry point number

IPTNUM Point number

IPTTAG Temporary variable

IPT1 First point to be operated upon

IPT2 Last point to be operated upon

IP1 Temporary variable

IP2 Temporary variable

IRAD Wire radius

IRADSV Saved wire radius

IS Segment number

ISAV Temporary variable

ISEGSV Temporary variable

ISEG1 First segment to be operated upon

ISEG2 Last segment to be operated upon

ITAG Tag identifier

ITYPE Type of data being operated upon

IXL Designates translation requirement (= ISON)

or no requirement (= ISOFF)

IX1 Packed word for plates containing number of

corners, plate number, and linking

information

LSTDFN Reference to end statement for a given

define

LSTMN Number of mnemonics

MITAG Minus ITAG

MN Indices to NCODES array

₩P Multiple point flag

NCORN Number of plate corners

NDXERR Pointer to error format table

NOXON Pointer to "ON" in NCODES array

NDXTRC Pointer to "TRACE" in NCODES array

NEWNAM Defined element name

NEWNUM New segment number

Number of points on MP card

NPRMSG Number of words per message

NPTSYM Point symmetry flag

NRF Flag indicating number of reflection axis

NRFP4 NRF + 4

NRFP5 NRF + 5

NUMBER of defined elements

NUMELM Number of elements to be combined

NUMFND Number of elements found

NUMBER Number of segments to be renumbered

NXTPT Next point

NXTSEG Next segment

R Radius table

X,Y,Z X,Y, and Z coordinates of geometry input

point

XN,YN,ZN Negative end of wire segment joining two

points

XP,YP,ZP Positive end of wire segment joining two

points

XQ,YQ,ZQ Third coordinate values after rotation

and/or translation

X1,Y1,Z1 End points

X2,Y2,Z2 End points

X3.Y3.Z3 Third coordinate values

5. I/O VARIABLES:

A. INPUT LOCATION

ISOFF /ADEBUG/

ISON /ADEBUG/

NCODE /SCNPAR/

NVAL /SCNPAR/

B. OUTPUT LOCATION

ISGTBL /SEGMNT/

SEGTBL /SEGMNT/

6. CALLING ROUTINE:

GEODRY

7. CALLED ROUTINES:

ASSIGN PUTSEG

COORDS REFLCT

CYLNOR ROTATE

ENDCAP SCAN

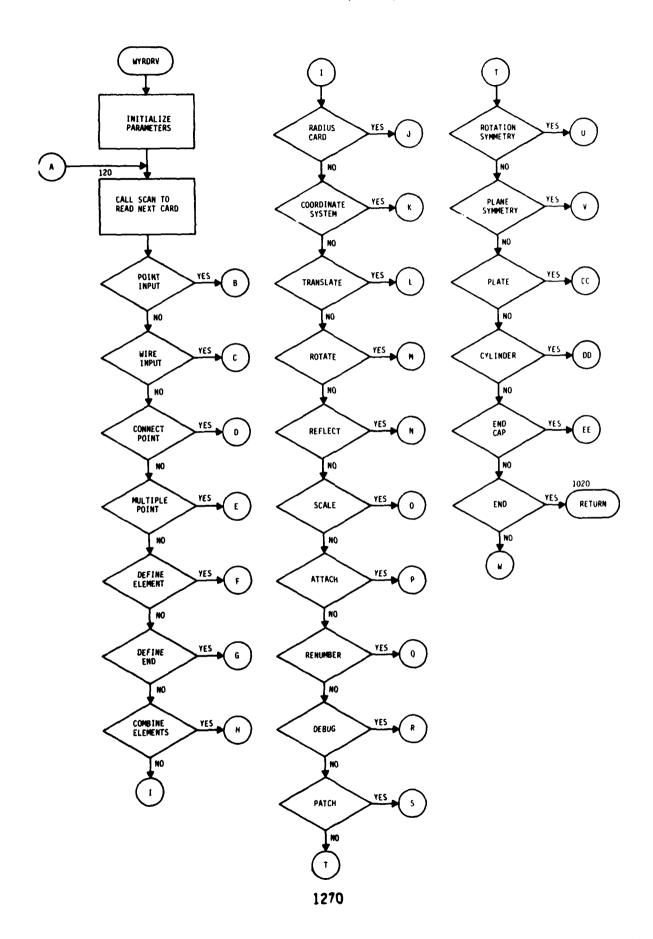
GETPHT STATIN

GETSEG STATOT

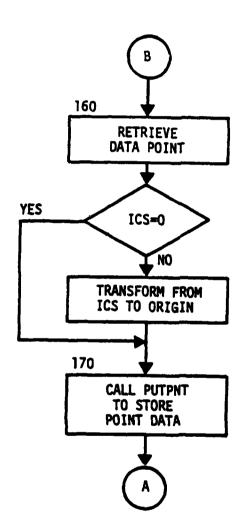
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PLATE WKLBCK

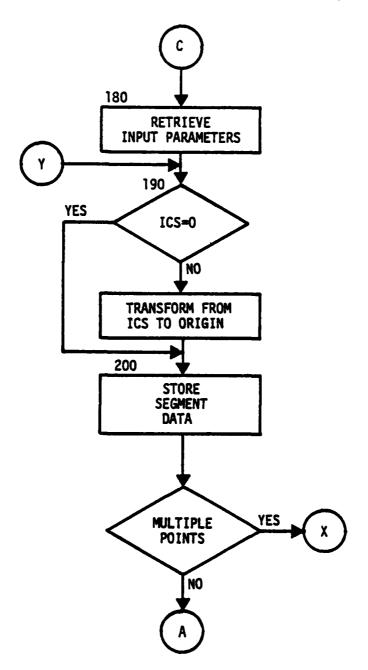
PUTPNT



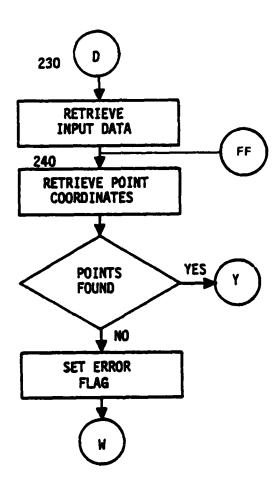
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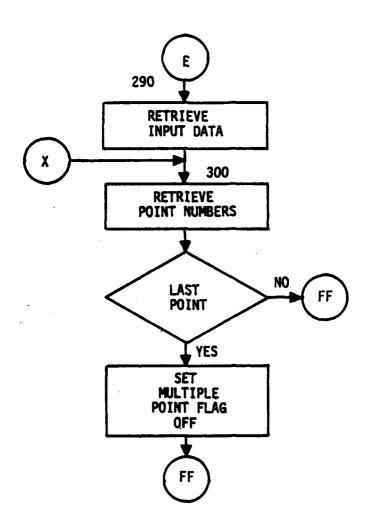
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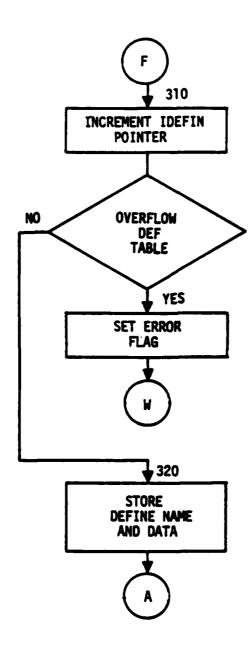
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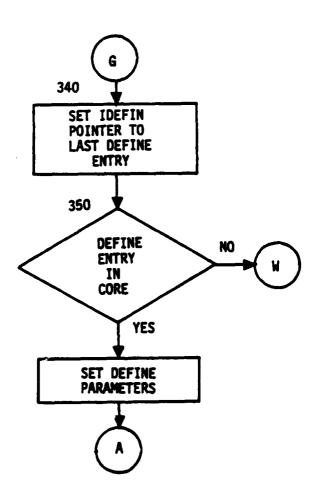
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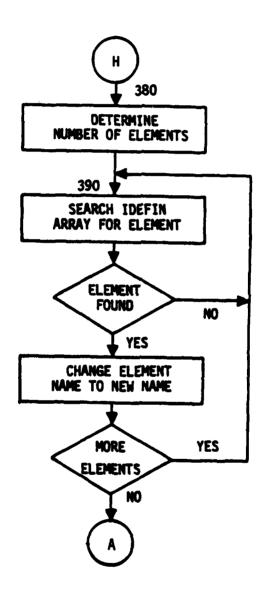
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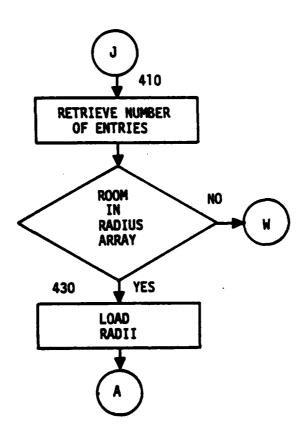
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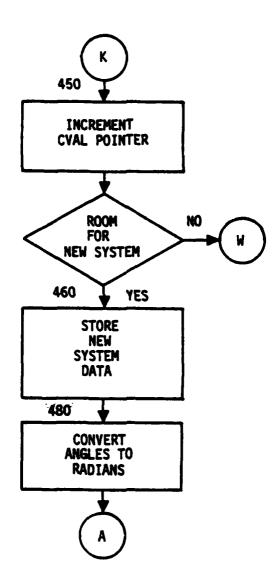
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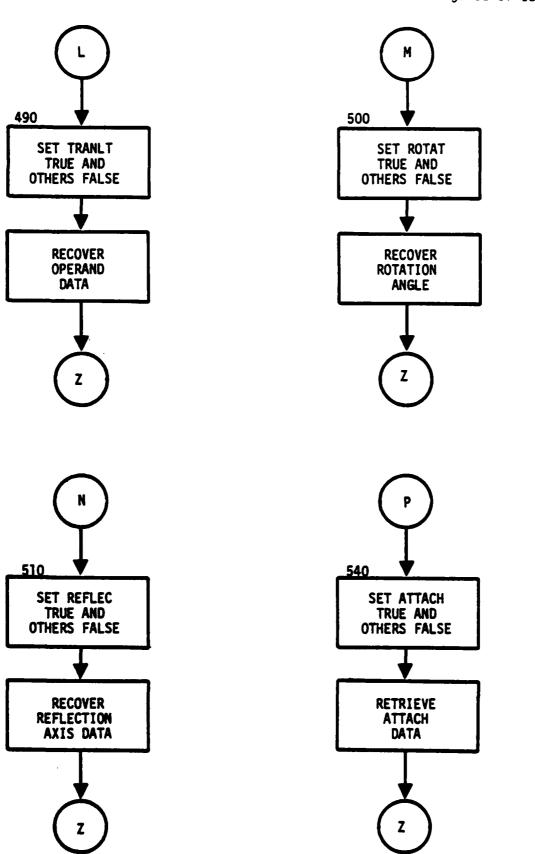


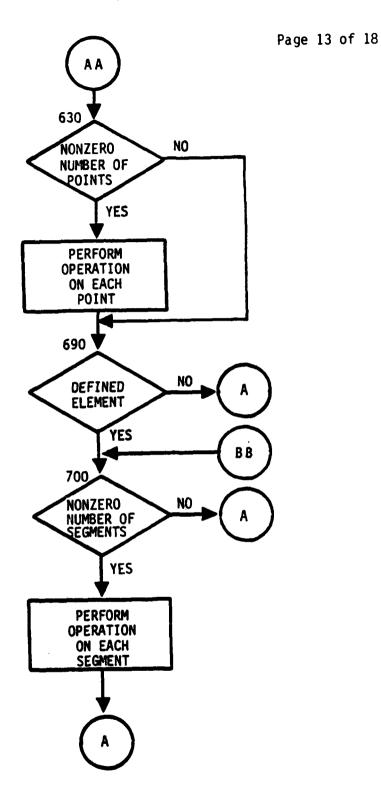
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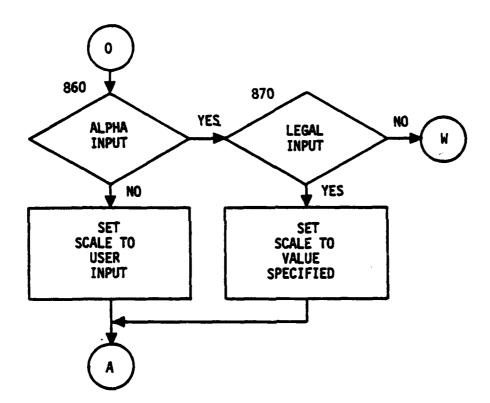


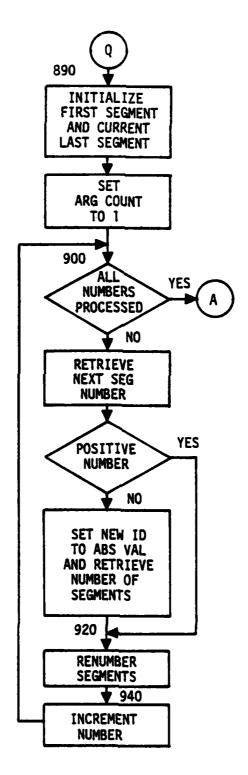




WYRDRV (INPUT)

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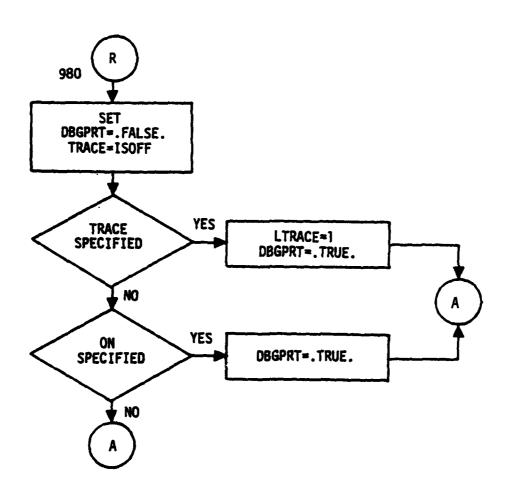




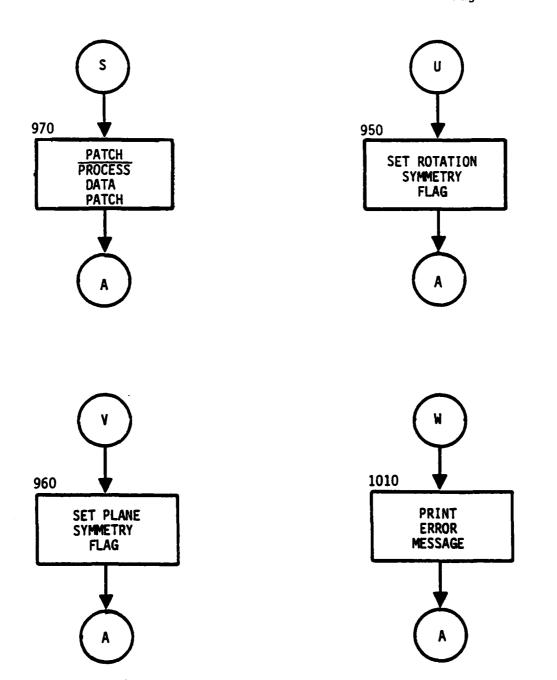
deed british spring division received springs cereical massive

WYRDRV (INPUT)

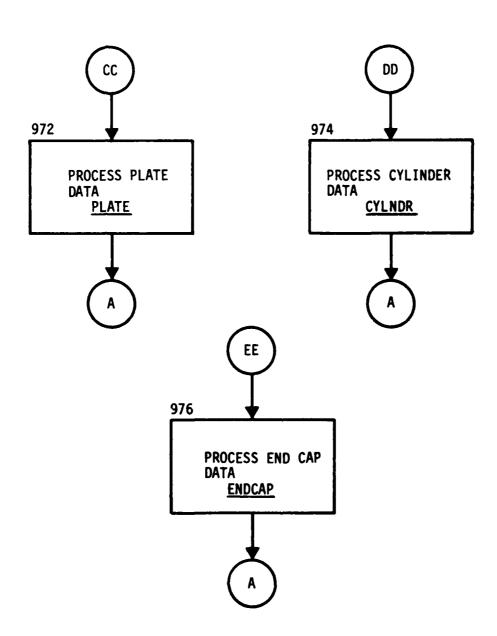
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WYRDRV (INPUT)



- 1. NAME: WYRPAT (MOM)
- 2. PURPOSE: Calculates the tangential electric field at the observation segment connected to a surface due to the current on the four patches around the connection point.
- 3. METHOD: When a wire is found to be connected to a patch, the patch is divided into four equal-area subpatches. These patches are located with respect to the vectors \hat{t}_1 and \hat{t}_2 as shown in figure 1, and the patch numbers indicate the order in the data array.

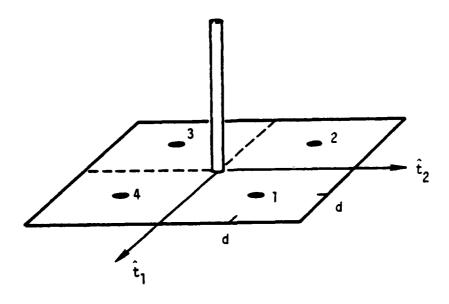


Figure 1. Subpatch Orientation and Geometry

The position of a point on the surface is defined by $\bar{\rho}$ $(S_1,S_2) = \bar{\rho}_0 + S_1\hat{\tau}_1 + S_2\hat{\tau}_2$, where $\bar{\rho}_0$ is the position of the center of the four patches where the wire connects, and S_1 and S_2 are coordinates measured from the center.

The current over the surface is represented by $\tilde{J}(S_1,S_2)$. The currents at the centers of the four patches are:

$$\tilde{J}_1 = \tilde{J}(d,d)$$

$$\bar{J}_2 = \bar{J}(-d,d)$$

$$\bar{J}_3 = \bar{J}(-d,-d)$$

$$\bar{J}_4 = \bar{J}(d,-d)$$

and the current at the base of the segment, flowing onto the surface, is I_0 . The current interpolation function is then

$$\overline{J}(S_1, S_2) = \left[\overline{f}(S_1, S_2) - \sum_{i=1}^{4} g_i(S_1, S_2) \overline{f}_i\right] I_0 + \sum_{i=1}^{4} g_i(S_1, S_2) \overline{J}_i$$

where

$$\overline{f}(S_1, S_2) = \frac{S_1 \hat{t}_1 + S_2 \hat{t}_2}{2\pi (S_1^2 + S_2^2)}$$

$$\bar{f}_1 = \bar{f}(d,d) = (\hat{t}_1 + \hat{t}_2)/(4\pi d)$$

$$\bar{f}_2 = \bar{f}(-d,d) = (-\hat{t}_1 + \hat{t}_2)/(4\pi d)$$

$$\bar{f}_3 = \bar{f}(-d,-d) = (-\hat{t}_1 - \hat{t}_2)/(4\pi d)$$

$$\bar{f}_4 = \bar{f}(d,-d) = (\hat{t}_1 - \hat{t}_2)/(4\pi d)$$

and

$$g_1(S_1,S_2) = (d + S_1)(d + S_2)/(4d^2)$$

$$g_2(S_1,S_2) = (d - S_1)(d + S_2)/(4d^2)$$

$$g_3(S_1,S_2) = (d - S_1)(d - S_2)/(4d^2)$$

$$g_4(S_1,S_2) = (d + S_1)(d - S_2)/(4d^2)$$

If $\bar{\epsilon}_1(\bar{\rho})dA$ and $\bar{\epsilon}_2(\bar{\rho})dA$ are the electric fields at the center of the connected segment due to unit currents at $\bar{\rho}$ on the surface dA, flowing in the directions \hat{t}_1 and \hat{t}_2 , respectively, the nine matrix elements to be computed are

$$\mathbf{E}_{1} = \int_{\mathbf{S}} \mathbf{g}_{1}(\mathbf{S}_{1}, \mathbf{S}_{2}) \hat{\mathbf{I}} \cdot \overline{\mathbf{\varepsilon}}_{1}(\overline{\rho}) d\mathbf{A}$$

$$\mathbf{E}_{2} = \int_{S} \mathbf{g}_{2}(\mathbf{S}_{1}, \mathbf{S}_{2}) \hat{\mathbf{I}} \cdot \overline{\mathbf{\varepsilon}}_{1}(\overline{\rho}) dA$$

$$\mathbf{E}_{3} = \int_{S} \mathbf{g}_{3}(\mathbf{S}_{1}, \mathbf{S}_{2}) \hat{\mathbf{I}} \cdot \overline{\mathbf{e}}_{1}(\overline{\rho}) dA$$

$$\mathbf{E_4} = \int_{\mathbf{S}} \mathbf{g_4}(\mathbf{S_1}, \mathbf{S_2}) \ \hat{\mathbf{I}} \cdot \overline{\mathbf{\epsilon}_1}(\overline{\mathbf{p}}) d\mathbf{A}$$

$$\mathbf{E}_{5} = \int_{S} \mathbf{g}_{1}(\mathbf{S}_{1}, \mathbf{S}_{2}) \hat{\mathbf{I}} \cdot \overline{\mathbf{\varepsilon}}_{2}(\overline{\rho}) d\mathbf{A}$$

$$\mathbf{E}_{6} = \int_{S} \mathbf{g}_{2}(\mathbf{S}_{1}, \mathbf{S}_{2}) \hat{\mathbf{I}} \cdot \overline{\mathbf{\varepsilon}}_{2}(\overline{\rho}) dA$$

$$\mathbf{E}_7 = \int_{\mathbf{S}} \mathbf{g}_3(\mathbf{S}_1, \mathbf{S}_2) \ \hat{\mathbf{I}} \cdot \overline{\mathbf{\epsilon}}_2(\overline{\rho}) d\mathbf{A}$$

$$\mathbf{E_8} = \int_{\mathbf{S}} \mathbf{g_4}(\mathbf{S_1,S_2}) \ \hat{\mathbf{I}} \cdot \overline{\mathbf{\epsilon}_2}(\overline{\rho}) d\mathbf{A}$$

$$\mathbb{E}_9 = \int_{S} \left[\overline{h}(S_1, S_2) \cdot \hat{t}_1 \right] \left[\hat{I} \cdot \overline{\epsilon}_1(\overline{\rho}) \right] +$$

$$\left[\overline{h}(S_1,S_2) \cdot \hat{t}_2\right] \left[\hat{I} \cdot \overline{\epsilon}_2(\overline{\rho})\right] dA$$

where

$$\bar{h}(s_1,s_2) = \bar{f}(s_1,s_2) - \sum_{i=1}^{4} g_i(s_1,s_2) \bar{f}_i$$

and where $\boldsymbol{\hat{I}}$ is the unit vector in the direction of the connected segment.

The integration is over the total area of the four patches and is performed by numerical quadrature. The number of increments in S_1 and S_2 used in integration is set by the variable NINT. When

WYRPAT (MOM)

WYRPAT is called, the parameters in AMPZIJ have the values for the first connected patch. During the integration, these parameters are set for each integration patch. At the end of WYRPAT they are reset to their original values.

4. INTERNAL VARIABLES:

| THIERWAL VANIABLES | |
|--------------------|--|
| VARIABLE | DEFINITION |
| AREA | Surface area of source patch |
| AREASV | Saved surface area of source patch |
| CABI | Observation segment unit vector in the x direction |
| 0 | Perpendicular distance from the center point of the patch to the edge of patch |
| DA | Differential area for source patch |
| DS | Length of the side of the differential area |
| EI1 to EI9 | Imaginary part of E1 to E9 |
| ER1 to ER9 | Real part of E1 to E9 |
| ETI1,ETR1 | Imaginary and real part of the projection of the electric field on the observation segment due to current in $\hat{\tau}_1$ direction on the source path |
| ETI2,ETR2 | Imaginary and real part of the projection of the electric field on the observation segment due to current in $\hat{\tau}_2$ direction on the source path |
| EWPR,EWPI | An array to store ER1 to ER9 and EI1 to EI9 |
| EXIT1,EYIT1,EZIT1 | X,Y, and Z components of imaginary part of electric field due to current in \hat{t}_1 direction on source patch at the observation segment |
| EXIT2,EYIT2,EZIT2 | X,Y, and Z components of imaginary part of electric field due to current in $\hat{\tau}_2$ direction on source patch at the observation segment |
| EXRT1,EYRT1,EZRT1 | X,Y, and Z components of real part of electric field due to current in \hat{t}_1 direction |

on source patch at the observation segment

| EXRT2,EYRT2,EZRT2 | X,Y, and Z components of real part of electric field due to current in \hat{t}_2 direction on source path at the observation segment |
|-------------------|--|
| FCON | $1/(4\pi d)$ |
| F1 | $\bar{h}(S_1,S_2)$ \hat{t}_1 |
| F2 | $\bar{h}(S_1,S_2) \cdot \hat{t}_2$ |
| GCON | 1/(4d ²) |
| G1 | g ₁ (S ₁ ,S ₂) |
| G2 | g ₂ (S ₁ ,S ₂) |
| G3 | g ₃ (S ₁ ,S ₂) |
| 64 | g4(S ₁ ,S ₂) |
| NINT | Number of intervals used for approximating the integrals for E_1 to E_9 |
| SABI | Observation segment unit vector in the y direction |
| SALPI | Observation segment unit vector in the z direction |
| S1 | $\text{S}_{1}\text{,}$ distance from the center of the four patches in the \hat{t}_{1} direction |
| S2 | S2, distance from the center of the four patches in the $\hat{\tau}_2$ direction |
| S2SAVE | Initial value of S ₂ |
| T1XJ,T1YJ,T1ZJ | X,Y, and Z components of \hat{t}_1 |
| T2XJ,T2YJ,T2ZJ | x, y , and z components of \hat{t}_2 |
| XI,YI,ZI | X, Y, and Z coordinates of the observation segment |
| XIJ,YIJ,ZIJ | X,Y, and Z components of the vector sepa- rating observation segment and the patch source |

WYRPAT (MOM)

| XJ,YJ,ZJ | Coordinates of | first | patch | or | differential |
|----------|----------------|-------|-------|----|--------------|
| | patch sources | | | | |

XJSAVE, YJSAVE, ZJSAVE

The saved x,y, and z coordinates of the source patch

XSS,YSS,ZSS Initial location of the differential patches

5. I/O VARIABLES:

TIYJ

CONTRACTOR STANDARDS CONTRACTOR

| 1/0 | AWKINDLE2: | |
|-----|------------|----------|
| A. | INPUT | U-CATION |
| | AREA | /AMPZIJ/ |
| | CABI | /AMPZIJ/ |
| | EXIT1 | /AMPZIJ/ |
| | EXIT2 | /AMPZIJ/ |
| | EXRT1 | /AMPZIJ/ |
| | EXRT2 | /AMPZIJ/ |
| | EYIT1 | /AMPZIJ/ |
| | EYIT2 | /AMPZIJ/ |
| | EYRT1 | /AMPZIJ/ |
| | EYRT2 | /AMPZIJ/ |
| | EZIT1 | /AMPZIJ/ |
| | EZIT2 | /AMPZIJ/ |
| | EZRT1 | /AMPZIJ/ |
| | EZRT2 | /AMPZIJ/ |
| | SABI | /AMPZIJ/ |
| | SALPI | /AMPZIJ/ |
| | TWOPI | /AMPZIJ/ |
| | T1XJ | /AMPZIJ/ |
| | | |

/AMPZIJ/

WYRPAT (MOM)

T1ZJ /AMPZIJ/ T2XJ /AMPZIJ/ T2YJ /AMPZIJ/ T2ZJ /AMPZIJ/ XI /AMPZIJ/ ΧJ /AMPZIJ/ ΥI /AMPZIJ/ YJ /AMPZIJ/ ZI /AMPZIJ/ ZJ /AMPZIJ/ **OUTPUT** LOCATION В. F.P. **EWPI** F.P. **EWPR**

6. CALLING ROUTINE:

NTRPLU

7. CALLED ROUTINES:

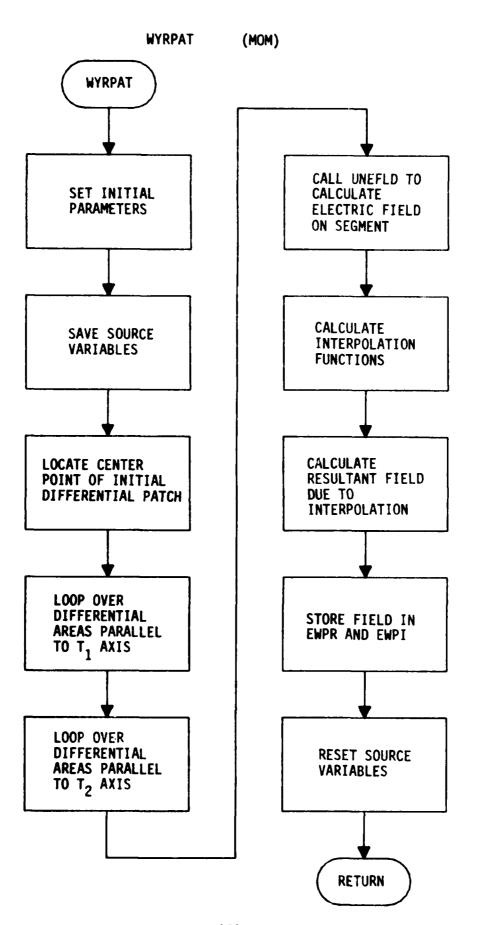
ASSIGN

STATIN

STATOT

UNEFLD

WLKBCK



- 1. NAME: XYZFLD (GTD)
- 2. PURPOSE: To convert the theta and phi components of the electric field into x, y, z components for the electric or magnetic field. The fields from unique scattering interactions are accumulated in common block FLDXYZ.
- 3. METHOD: The theta and phi compone of the electric field are sent as formal parameters to this subroutine. If magnetic fields were requested, they are defined as:

$$H_{\theta} = \frac{-1}{\eta} E_{\phi}$$

$$H_{\Phi} = \frac{1}{\eta} E_{\theta}$$

in theta and phi components. Eta (η) is the intrinsic impedance of free space. The theta and phi components of the electric field are shown in figure 1.

Vector algebra is used to compute the x, y, z components . the field from its theta and phi components. The x, y, z components are shown in figure 2. These components are then accumulated in common block FLDXYZ.

4. INTERNAL VARIABLES:

MANAGE CHANGE CONTROL

| VARIABLE | DEFINITION |
|----------|---|
| AP | Phi component of either E- or H-field |
| AT | Theta component of either E- or H-field |
| D | Observation direction |
| EP | Phi component of E-field |
| ET | Theta component of E-field |
| FX | X component of field |
| FY | Y component of field |
| FZ | Z component of field |
| IEH | Indicator for field type requested. If IEH = 0, magnetic H-field wanted. If IEH = 1, the electric E-field was requested |

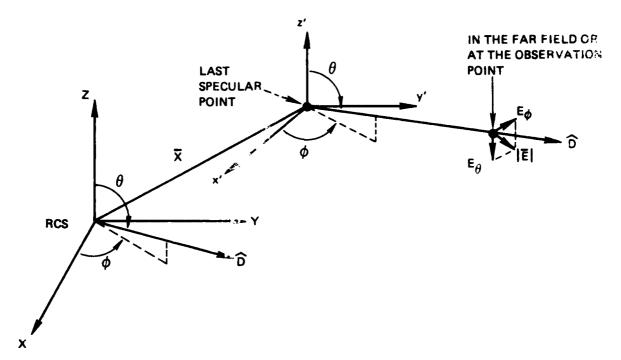


Figure 1. Theta and Phi Components of Electric Field

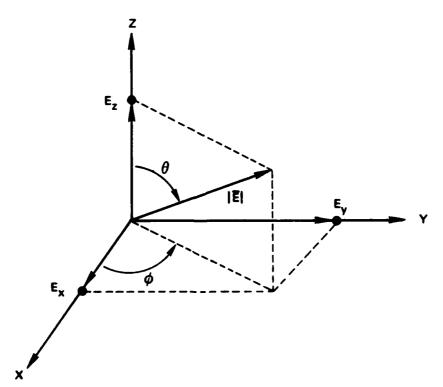


Figure 2. The X, Y, Z Components of the Field

XYZFLO (GTD)

P Phi angle of observation direction

T Theta angle of observation direction

5. I/O VARIABLES:

/EHFLD/

D F.P.
EP F.P.
ET F.P.

FX /FLDXYZ/
FY /FLDXYZ/

FZ /FLDXYZ/

B. OUTPUT LOCATION

FX /FLDXYZ/
FY /FLDXYZ/

FZ /FLDXYZ/

6. CALLING ROUTINES:

IEH

DIFPLT REFCAP

DPLRCL RPLDPL

DPLRPL RPLRPL

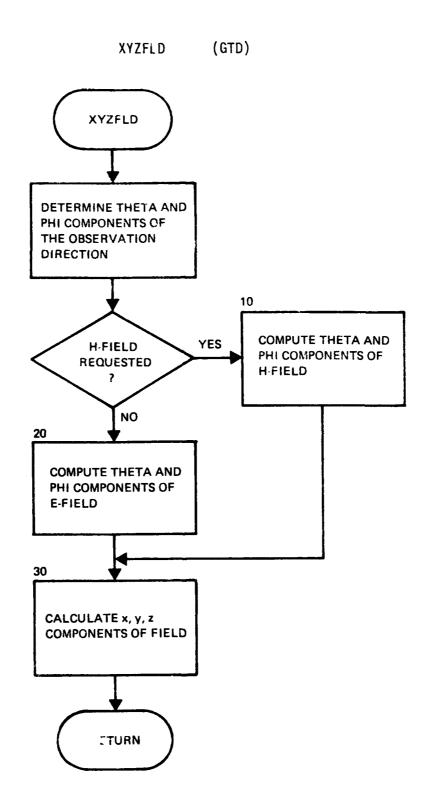
ENDIF RPLSCL

INCFLD SCLRPL

RCLDPL SCTCYL

7. CALLED ROUTINE:

BTAN2



- 1. NAME: ZCDRVR (MOM)
- 2. PURPOSE: Routine to interface the user ZCODE subroutines with the GEMACS program.
- 3. METHOD: The subroutine number requested by the user is called by this routine.
- 4. INTERNAL VARIABLES:

NONE

5. I/O VARIABLES:

NONE

6. CALLING ROUTINE:

TSKXQT

7. CALLED ROUTINES:

ASSIGN

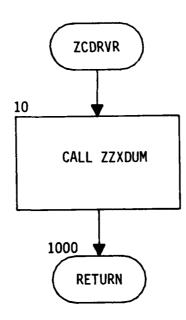
STATIN

STATOT

WLKBCK

ZZXDUM

ZCDRVR (MOM)



1. NAME: ZGTDRV (GTD)

I STATEMENT STATEMENT STATEMENT STATEMENT

- 2. PURPOSE: To interface the GTD physics routines with the three physics drivers: EXCDRV, FLDDRV and ZIJDRV.
- 3. METHOD: ZGTDRV loops over source and observation points and fills the matrix CM(J,I) with the field at observation location I due to the unit source at source position J. The fields which are calculated in ZGTDRV are due to the GTD interactions set by interaction array KJ. Method of moments interactions are computed in the MOM module.

The definitions of source and observation points are related to the type of problem as specified by ITYPE:

| <u>ITYPE</u> | PROBLEM | SOURCE POINTS | OBSERVATION POINTS |
|--------------|-----------------------------|---|---|
| 1. | Interaction matrix (ZGEN) | Wire segment tangential currents or patch sur-face current densities | Wire segments or patch surfaces |
| 2. | Excitation vector (ESRC) | Three vector components of electric field source as specified on ESRC card | Wire segments or patch surfaces |
| 3. | Scattered Field (EFIELD) | Wire segment tangential current or patch surface current densities | Field points as in EFIELD command |
| 4. | Incident Field (EFIELD) | Three vector components of all electric field sources contributing to solution vector | Field points as specified in EFIELD command |

It is not necessary that the interaction matrix stored in CM represent the entire physics problem, nor that it be square. The JSRC1, JSRC2, IOBS1, IOBS2 indices reference the source and observation point limits for this call to ZGTDRV, with the interaction between JSRC1 source and IOBS1 observation point stored in CM(1,1), etc.

ZGTDRV has two main loops, an outer loop over source points and an inner loop over observation points. For geometry object source or field points, data are obtained from /AMPZIJ/ after a call to SEJCON. Otherwise data are obtained from subroutine GETFLD.

The number of calls to GTDDRV is then computed for this source-observation point pair. Normally, there is only one call. However, if the source is a wire segment for which the source-observation

separation distance is less than RAPPRX wavelengths, three calls are made to GTDDRV, one each for pulse, sine, and cosine components of the wire segment basis function.

GTDDRV returns the rectangular components of the field vector at the observation point. These are transformed into the tangential components required at the observation point:

| OBSERVATION POINT TYPE | FIELD TYPE | TANGENTIAL COMPONENTS |
|------------------------|------------|---|
| Wire Segment | Ē | 1 - Wire Axis |
| Patch | Ĥ | 2 - Patch surface currents |
| Far Field | Ē | 2 - E ₀ , E ₀ |
| Near Field | Ē | 3 - Er Eg Eg depends on coordinates Ex Ey Ez on EFIELD card |

The interaction matrix is filled in one of two ways. The tangential field values are added to the present contents of CM if there has been only one call to GTDDRV. This is called direct fill. If, however, there were three calls to GTDDRV, subroutines INTPLT and JNCSUM are called in order to allocate the tangential field among the three or more basis functions which span the source wire segment. Wire segments connected to ground or plates are treated by the method of images. Direct interaction between a wire segment connected to a patch and the patch to which it is connected is deferred to the MOM module.

Before returning, ZGTDRV makes an entry into the shadowing matrix for ITYPE = 1 if the observation point cannot be seen by the source point. The entry is a packed word. The source point SEGTBL segment number is placed in the left half of the word. The observation point SEGTBL segment number is placed in the right half of the word. The shadowing matrix is used by ZIJSET (MOM) so that direct MOM interactions will not be added into the interaction matrix for shadowed source-observation paths.

4. INTERNAL VARIABLES:

| VARIABLE | DEFINITION |
|----------|---|
| СМ | Complex interaction matrix filled by ZGTDRV |
| CURENT | Complex source excitation value |

| DT | Difference in time from the last call to TICHEK |
|---------------|---|
| EHR, EHI | Real and imaginary parts of tangential E-or H-field |
| EHT . | Complex array of tangential field components |
| FP1, FP2, FP3 | Coordinates (near field) or θ - ϕ direction (far field) of observation point |
| FREQ | Internal variable equal to source frequency in megahertz |
| FSIGN | Positive or negative, depending on whether tangential fields are to be added to or subtracted from CM |
| FT | Array of interpolated tangential fields (complex) |
| FX, FY, FZ | The x,y,z components of the field |
| I | Observation loop index |
| IBSCER | Flag indicating if an error occurred in GTDDRV |
| IEH | Field type indicator: $1 = E-field$, $0 = H-field$ |
| IFDTYP | Flag indicating near field (1) or far field (0) |
| II | Segment number of geometry observation point |
| IOBS | Column of CM in which interaction is stored |
| 10BS1 | Pointer to first observation point for this call to ZGTDRV |
| 108S2 | Pointer to last observation point for this call to ZGTDRV |
| ISC | Internal variable indicating source type for GTDDRV call |
| ISCTYP | Source type indicator |

ISDWFL Flag indicating that source is shadowed

from observation point

ISG Flag indicating source (-1) or observation

(1) segment for SEJCON call

ISHADW Shadowing array

ISHWRD Packed word of shadowed source-observation

pair

ITYP Internal variable indicating field source

point for call to GETFLD

ITYPE Interaction problem type

IX Internal parameter equal to I

J Source loop index

JCOL Internal variable equal to NCOL

JJ Segment number of geometry source point

JROW Internal variable equal to NROW

JSRC Row of CM in which interaction is stored

JSRC1 Pointer to first source point for this call

to ZGTDRV

JSRC2 Pointer to last source point for this call

to ZGTDRV

JX Internal parameter equal to J

KJ Array of GTD interactions specified for

this call to ZGTDRV

KPR Internal variable equal to IOBS for call to

JNCSUM

LSRCFL Flag indicating if source has changed since

last call to GTDDRV

M Index over tangential field loop

N GTDDRV call number

NAMGEO User-assigned name of geometry data set

NCALL Total number of GTDDRV calls to compute a

source-observation pair interaction

NCOL Number of columns in CM

NROW Number of rows in CM

NSHAD Pointer to last entry in shadowing matrix

NTANF Number of tangent vectors for an observa-

tion point

NTANS Number of tangent vectors for a source

point

R Source-observation point separation

distance (in meters)

RAPPRX Minimum separation distance in wavelengths

in order to take advantage of far-field

approximation.

RSQ R*R

SP1, SP2 Source parameters passed to GTDDRV

TLEFT Execution time remaining

TNOW Current time

TSTART Execution time at beginning of ZGTDRV

TXF,TYF,TZF Array of observation target unit vectors

TXS,TYS,TZS Array of source target unit vectors

XNS,YNS,ZNS Patch normal unit vector

XS,YS,ZS Source point coordinates

5. I/O VARIABLES:

A. INPUT LOCATION

AMPZIJ/

CABI /AMPZIJ/

CABJ /AMPZIJ/ CM F.P. **DBGPRT** /ADEBUG/ **FRQMHZ** /AMPZIJ/ IOBS1 F.P. IOBS2 F.P. **IP217** /GEODAT/ **ISHADW** F.P. **ISOFF** /ADEBUG/ ISON /ADEBUG/ ITYPE F.P. JC01 /AMPZIJ/ JC02 /AMPZIJ/ JIX /JUNCOM/ JIZ /JUNCOM/ JOX /JUNCOM/ JOZ /JUNCOM/ JSRC1 F.P. JSRC2 F.P. KJ F.P. LUPRNT /ADEBUG/ MAXCON /JUNCOM/ NAMGEO F.P. NCIX /JUNCOM/

NCIZ

/JUNCOM/

F.P. NCOL NCOX /JUNCOM/ NCOZ /JUNCOM/ **NROW** F.P. **NSHAD** F.P. NWIRE /SEGMNT/ S /AMPZIJ/ SABI /AMPZIJ/ SABJ /AMPZIJ/ **SALPI** /AMPZIJ/ **SALPJ** /AMPZIJ/ TIMTGO **SYSFIL** T1XI,T1YI,T1ZI /AMPZIJ/ T2XI,T2YI,T2ZI /AMPZIJ/ TIXJ,TIYJ,TIZJ /AMPZIJ/ T2XJ,T2YJ,T2ZJ /AMPZIJ/ WAVLGH /AMPZIJ/ XI,YI,ZI /AMPZIJ/ XJ,YJ,ZJ /AMPZIJ/ /ADEBUG/ **ZERO OUTPUT** LOCATION CM F.P. **IERRF** /ADEBUG/ **ISHADW** F.P.

Control of the Contro

В.

NSHAD

F.P.

| 6. | CALLING | ROUTINES: |
|----|---------|------------------|
|----|---------|------------------|

EXCDRV

FLDDRV

ZIJDRV

7. CALLED ROUTINES:

ASSIGN

ERROR

GETFLD

GTDDRV

INTPLT

JNCSUM

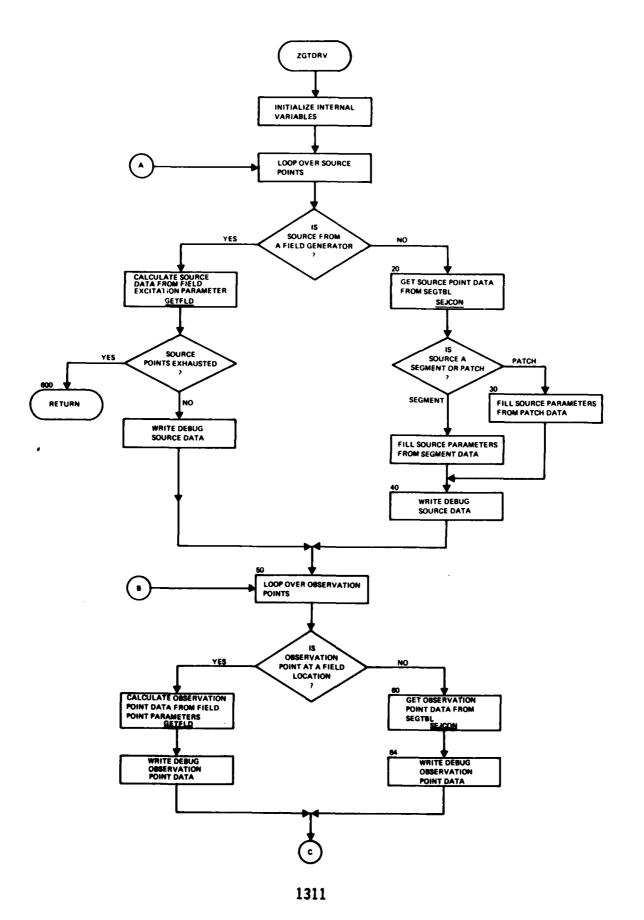
SEJCON

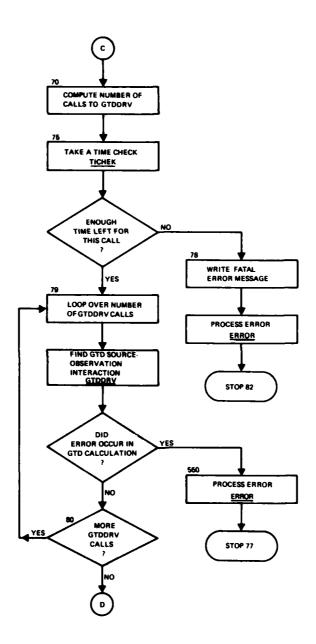
STATIN

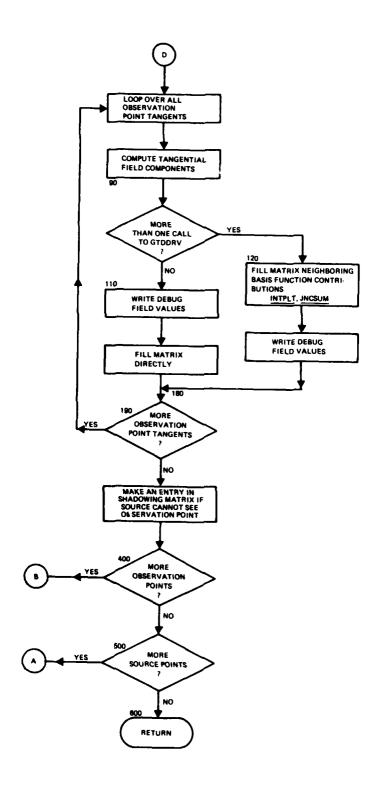
STATOT

TICHEK

WLKBCK







- 1. NAME: ZIJDRV (GTD)
- 2. PURPOSE: Interface the GTD physics routines with the GEMACS interaction matrix generator and task execution processor.
- 3. METHOD: The interface parameters for the interaction matrix generator are passed through the ARGCOM array FLTARG. The arguments are:
 - INTARG (1) Keyword name for sine + cosine + pulse expansion
 - INTARG (2) Location of geometry storage area in NDATBL
 - INTARG (3) Pointer to frequency (MHz)
 - INTARG (4) Pointer to conductivity
 - INTARG (5) Pointer to relative permittivity
 - INTARG (6) Index to load data in NDATBL
 - INTARG (7) Index to interaction matrix in NDATBL

All of the required input parameters for calling subroutine ZGTDRV are computed and passed through the calling statement and common variables. If there is not enough room in the data set specified for the interaction matrix, the matrix is redefined on a peripheral file with the proper dimensions.

The results of ZIJDRV (GTD) depend on the physics interactions specified by the user on the SETINT command. If no GTD interactions were requested, ZIJDRV returns without generating a matrix. Otherwise ZIJDRV generates the GTD portion of the interaction matrix for the geometry specified in INTARG(2). If there are no MOM objects in the geometry, the routine prints a warning message and returns. If GTD interactions are requested, but there are no GTD objects in the geometry, a zero interaction matrix is created.

If MOM interactions were requested, a geometry shadowing matrix is created, consisting of segment pairs packed into single words. A segment pair is entered if the source segment cannot see the observation segment directly. ZIJDRV (MOM) uses this matrix to avoid calculating MOM interactions for shadowed pairs. The interaction matrix is sorted prior to exit and contains no duplicate entries. Note that a patch is represented by its segment number, not its interaction matrix row number.

The calculation of GTD interactions with a ground plane are not allowed. The conductivity and permittivity parameters are checked, and if they are not equal to NOPCOD an error message is generated and execution terminated.

ZIJDRV (GTD)

4. INTERNAL VARIABLES:

| VARIABLE | DEFINITION |
|----------|---|
| EPSR | Relative dielectric constant of ground plane |
| I | Loop index over number of basis functions and columns of interaction matrix in TEMP |
| I1 | First column of interaction matrix in TEMP |
| IBASIS | Pointer to basis function pointer in KWBASE |
| IBITS | Attribute word for interaction or shadowing matrix |
| ICOL2 | Number of columns thus far computed for the interaction matrix |
| II | Pointer to last entry in interaction array |
| IJZLOC | Index to location of interaction matrix in NDATBL |
| IOBS1 | First observation point number for this call to ZGTDRV |
| IOBS2 | Last observation point number for this call to ZGTDRV |
| IPERF | A flag indicating a perfectly conducting ground plane |
| ISAVE | Saved value of ISHADW |
| ISHADW | Shadowing matrix |
| ISTART | First column of interaction matrix in call to ZGTDRV |
| ISTOP | Last column of interaction matrix in call to ZGTDRV |
| ITYPE | GTD interaction type |
| IYRLOC | Index to geometry data set in NDATBL |
| J | Loop index over number of columns of interaction matrix in TEMP |

ZIJDRV (GTD)

K Index over interaction matrix rows

KALL Counter indicating the number of calls to

ZGTDRV

KCOLS Number of columns of interaction matrix

which will fit into core

KJ GTD interaction array

KSYMP Image flag

KWBASE Array of pointers to basis function keyword

numbers

KWNDX Keyword index of user-specified basis func-

tion

LOCGEO Location of geometry data set index in

INTARG

LOCZIJ First word address of interaction matrix in

TEMP

M Inner loop index in shadowing matrix sort

N Loop index over shadowing matrix entries

N1 N-1

SACCOLO MONDO MACONIO

NAMESH Name of shadowing matrix

NAMEXP Name of expansion function for wire

currents

NAMEYR User-assigned name of geometry data set

NAMEZ User-assigned name of interaction matrix

NAMGEO Pointer to default name of geometry data

set in NCODES

NAMSHD Right-most three characters of shadowing

matrix = "SHD"

NAMYRS Internal variable equal to NAMEYR

NAMZIJ Pointer to default name of interaction

matrix in NCODES

ZIJDRV (GTD)

NC Number of interaction matrix columns to be

generated in a call to ZGTDRV

NCOL Number of interaction matrix columns to be

zeroed

NCOLS Actual number of columns in full inter-

action matrix

NDX Pointer to basis function name in NCODES

NDXARG Pointer to INTARG argument

NEED Additional core needed

NELRW Number of words per interaction matrix row

NELTTL Total number of words for block of inter-

action matrix

NP Hollerith name of expansion function

NPRSYM Dimension of symmetry operator

NR Hollerith name of geometry data set

NROWS Number of basis functions used to expand

solution

NROWX Internal variable equal to NROWS

NS Hollerith name of load vector

NSHADW Number of entries in shadowing matrix

NSHAD1 Number of shadowing matrix entries minus 1

NSHIFT Number of bits in three GEMACS format

literal characters

NUMBAS Number of basis functions implemented in

MOM formulation

NY Hollerith name of geometry data set with no

MOM objects

NYRSYM Variable indicating type and degree of

symmetry

ZIJDRV (GTD)

NZ Hollerith name of interaction matrix data

set

RAPPRX Minimum distance in wavelengths for which a

pulse basis function approximation can be

used

SYMFLG Symmetry flag (logical)

5. I/O VARIABLES:

A. INPUT LOCATION

CLITE /AMPZIJ/

DBGPRT /ADEBUG/

FLTARG /ARGCOM/

INTARG /ARGCOM/

IPASS /ARGCOM/

IP217 /GEODAT/

ISOFF /ADEBUG/

ISON /ADEBUG/

KBCPLX /PARTAB/

KBORDR /PARTAB/

KBREAL /PARTAB/

KBSNGL /PARTAB/

KBZIMP /PARTAB/

KJGTD /INTMAT/

KJINT /INTMAT/

KJMOM /INTMAT/

KOLCOL /PARTAB/

KOLLNK /PARTAB/

KOLNAM /PARTAB/

ZIJDRV (GTD)

| | KWNAME | /PARTAB/ |
|---|--------|----------|
| | LSTSYS | /SYSFIL/ |
| | LUPRNT | /ADEBUG/ |
| | NAMSEG | /SEGMNT/ |
| | NBYTSZ | /ADEBUG/ |
| | NCODES | /PARTAB/ |
| | NDATBL | /PARTAB/ |
| | NPATCH | /SEGMNT/ |
| | NOPCOD | /ADEBUG/ |
| | NTEMPS | /TEMPO1/ |
| | NTFLPT | /ADEBUG/ |
| | NTSYMB | /ADEBUG/ |
| | NUMGTD | /GTDDAT/ |
| | NWIRE | /SEGMNT/ |
| | RSTART | /SYSFIL/ |
| | TWOPI | /AMPZIJ/ |
| • | OUTPUT | LOCATION |
| | CHKWRT | /SYSFIL/ |
| | EPSR | /AMPZIJ/ |
| | FRQMHZ | /AMPZIJ/ |
| | IERRF | /ADEBUG/ |
| | IPERF | /AMPZIJ/ |
| | KSYMP | /AMPZIJ/ |
| | LSTSYS | /SYSFIL/ |
| | NYRSYM | /SEGMNT/ |
| | TEMP | /TEMPO1/ |

ZIJORV (GTD)

WAVLGH

/AMPZIJ/

WAVNUM

/AMPZIJ/

6. CALLING ROUTINE:

TSKXQT

7. CALLED ROUTINES:

ASSIGN

CONVRT

ERROR

GETARG

GETGEO

GETSYM

PRTKJ

PUTSYM

STATIN

STATOT

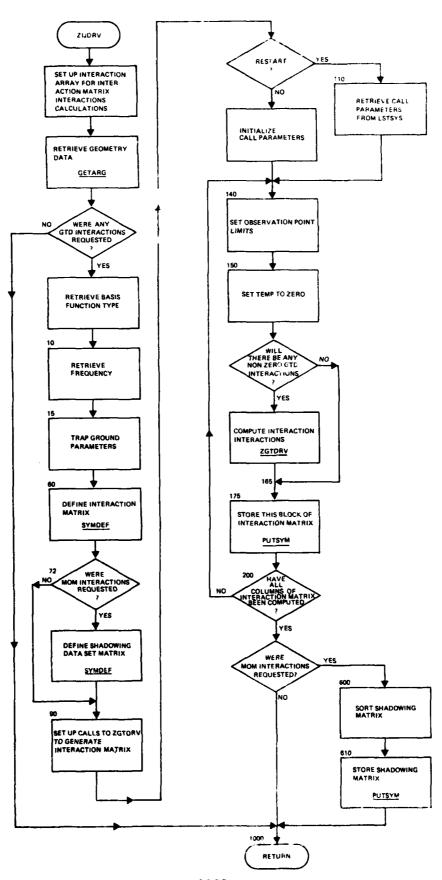
SYMDEF

SYMUPD

SYSCHK

WLKBCK

ZGTDRV



- 1. NAME: ZIJDRV (MOM)
- 2. PURPOSE: This subroutine interfaces the interaction matrix generator with the task execution processor.
- 3. METHOD: The interface parameters for the interaction matrix generator are passed through the ARGCOM array FLTARG. The arguments are:
 - INTARG (1) Keyword name for sine + cosine + pulse expansion
 - INTARG (2) Location of geometry storage area in NDATBL
 - INTARG (3) Pointer to frequency (MHz)
 - INTARG (4) Pointer to conductivity
 - INTARG (5) Pointer to relative permittivity
 - INTARG (6) Index to load data in NDATBL
 - INTARG (7) Index to interaction matrix in NDATBL

All of the required input parameters for calling subroutine ZIJSET are computed and passed through the calling statement and common variables. If there is not enough room in the data set specified for the interaction matrix, the matrix is redefined on a peripheral file with the proper dimensions.

The results of ZIJDRV (MOM) depend on the physics interactions specified by the user. If no MOM interactions are requested on the SETINT command no calculations are made and the routine returns control to TSKXQT. If MOM interactions are requested but there are no MOM objects in the geometry, a warning message is printed, and no calculations are made. If GTD interactions are requested along with MOM interactions ZIJDRV assumes that the interaction matrix contains the GTD interactions upon entry. ZIJDRV adds the MOM interactions to these values. If no GTD interactions are specified on the SETINT command, ZIJDRV creates a null interaction matrix to which the MOM interactions are added.

If GTD interactions have been specified, a geometry shadowing matrix generated by ZIJDRV is also retrieved and used to avoid calculating direct path MOM interactions between pairs of elements which are shadowed by GTD geometry objects. Otherwise, a null shadowing matrix is created by ZIJDRV, and all MOM interactions are computed.

Load impedances are added to the diagonal elements of the interaction matrix. These values are obtained from a load data set (previously calculated) and specified on the command (INTARG(6)).

It is possible to greatly speed up interaction matrix generation by taking symmetry into account. The following conditions are required:

- (1) No ground plane images
- (2) Symmetry present in geometry
- (3) Symmetry present in loads
- (4) No GTD interactions specified
- (5) No incident fields requested

The interaction matrix calculated by ZIJDRV is stored in a temporary data set. This matrix is premultiplied by the symmetry operator in subroutine SYMMOD and reblocked into proper format by REBLCK. REBLCK takes the symmetry format matrix and stores it in the user-assigned interaction matrix data set. The temporary file is released, and the temporary data set name removed from the symbol table.

4. INTERNAL VARIABLES:

EXECUTE CONTRACTOR DESIGNATION CONTRACTOR

| VARIABLE | DEFINITION |
|----------|---|
| EPSR | Relative dielectric constant of ground plane |
| I | Loop index over number of basis functions and columns of interaction matrix in TEMP |
| 11 | First column of interaction matrix in TEMP |
| IBITS | Attribute word for interaction or shadowing matrix |
| ICOL2 | Number of columns thus far computed for the interaction matrix |
| IFILE | Logical unit of temporary interaction matrix |
| IJZLOC | Index to location of interaction matrix in NDATBL |
| ILOAD | Index to load data set in NDATBL |
| IPERF | A flag indicating a perfectly conducting ground plane |

| ISHADW | Shadowing matrix |
|--------|--|
| IYRLOC | Index to geometry data set in NDATBL |
| J | Loop index over number of columns of inter- action matrix in TEMP |
| JCOL2 | Last column of interaction matrix in TEMP |
| K | Index over interaction matrix rows |
| KALL | Counter indicating the number of calls to ZIJSET |
| KCOLS | Number of columns of interaction matrix which will fit into core |
| KSYMP | Image flag |
| KWBASE | Array of pointers to basis function keyword numbers |
| KWNDX | Keyword index of user-specified basis function |
| L | Offset pointer used to zero TEMP |
| LOADSM | A flag indicating load symmetry |
| LOCCOL | First word address of a column of inter- action matrix in TEMP |
| LOCDIA | First word address of a diagonal of inter- action matrix in TEMP |
| LOCGEO | Location of geometry data set index in INTARG |
| LOCLOO | First word address of load vector in TEMP |
| LOCSCR | First word address of scratch area in TEMP |
| LOCSYM | First word address of symmetry operator in TEMP |
| LOCZIJ | First word address of interaction matrix in TEMP |
| N | Loop index over shadowing matrix entries |
| NAMESH | Name of shadowing matrix |

NAMEXP Name of expansion function for wire

currents

NAMEYR User-assigned name of geometry data set

NAMEZ User-assigned name of interaction matrix

NAMEZ1 Computer generated name of the temporary

interaction matrix used when symmetry is

used

NAMGEO Pointer to default name of geometry data

set in NCODES

NAMLDS User-assigned name of load vector

NAMSHD Right-most three characters of shadowing

matrix = "SHD"

NAMYRS Internal variable equal to NAMEYR

NAMZIJ Pointer to default name of interaction

matrix in NCODES

NC Number of interaction matrix columns to be

generated in a call to ZIJSET

NCL Number of interaction matrix columns to be

zeroed

NCOLS Actual number of columns in interaction

matrix taking into account symmetry

NDX Pointer to basis function name in NCODES

NEED Additional core needed

NN Internal variable equal to I for subroutine

call

NP Hollerith name of expansion function

NPRSYM Dimension of symmetry operator

NR Hollerith name of geometry data set

NROWS Number of basis functions used to expand

solution

NRWX2 2*NROWS

NS Hollerith name of load vector

NSH Hollerith name of shadowing matrix

NSHAD Number of entries in shadowing matrix

NSHIFT Number of bits in three GEMACS format

literal characters

NUMBAS Number of basis functions implemented in

MOM formulation

NY Hollerith name of geometry data set with no

MOM objects

NYRSYM Variable indicating type and degree of

symmetry

NZ Hollerith name of interaction matrix data

set

RAPPRX Minimum distance in wavelengths for which a

pulse basis function approximation can be

used

RPPRX RAPPRX in meters

SIGMA Ground plane conductivity in mhos/m

SYMFLG Symmetry flag (logical)

ZRATI Normalized normal incidence impedance of

ground plane (unitless)

$$\left[\left(\frac{\varepsilon_1}{\varepsilon_0}\right)\left(1-\frac{j\sigma}{\omega\varepsilon_1}\right)\right]^{-1/2}$$

5. I/Q VARIABLES:

A. INPUT LOCATION

CHKWRT /SYSFIL/

CLITE /AMPZIJ/

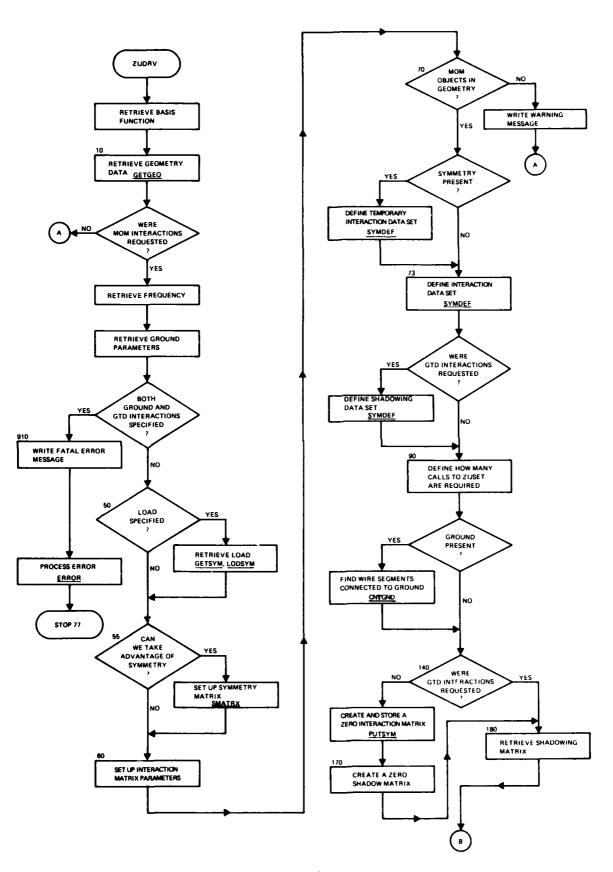
DBGPRT /ADEBUG/

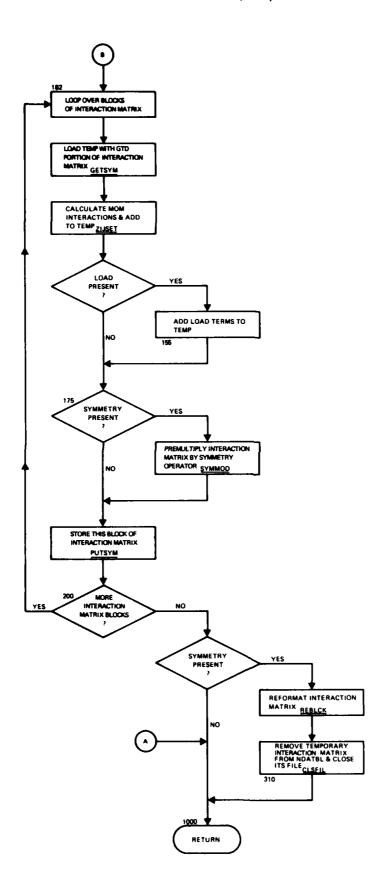
FJ /AMPZIJ/

| FLTARG | /ARGCOM/ |
|--------|----------|
| INTARG | /ARGCOM/ |
| IPASS | /ARGCOM/ |
| ISOFF | /ADEBUG/ |
| ISON | /ADEBUG/ |
| KBCPLX | /PARTAB/ |
| KBORDR | /PARTAB/ |
| KBREAL | /PARTAB/ |
| KBSNGL | /PARTAB/ |
| KBZIMP | /PARTAB/ |
| KJFLD | /INTMAT/ |
| KJGTD | /INTMAT/ |
| KJMOM | /INTMAT/ |
| KOLCOL | /PARTAB/ |
| KOLLNK | /PARTAB/ |
| KOLLOC | /PARTAB/ |
| KOLNAM | /PARTAB/ |
| KWNAME | /PARTAB/ |
| LSTSYS | /SYSFIL/ |
| LUPRNT | /ADEBUG/ |
| NAMSEG | /SEGMNT/ |
| NBYTSZ | /ADEBUG/ |
| NCODES | /PARTAB/ |
| NDATBL | /PARTAB/ |
| NOPCOD | /ADEBUG/ |
| | |

| | NPATCH | /SEGMNT/ |
|----|--------|----------|
| | NPDATA | /PARTAB/ |
| | NTEMPS | /TEMPO1/ |
| | NTFLPT | /ADEBUG/ |
| | NTSYMB | /ADEBUG/ |
| | NUMSEG | /SEGMNT/ |
| | NWIRE | /SEGMNT/ |
| | RSTART | /SYSFIL/ |
| | TPCEPI | /AMPZIJ/ |
| | TWOPI | /AMPZIJ/ |
| | ZER0 | /ADEBUG/ |
| В. | OUTPUT | LOCATION |
| | CHKWRT | /SYSFIL/ |
| | EPSR | /AMPZIJ/ |
| | FRQMHZ | /AMPZIJ/ |
| | IERRF | /ADEBUG/ |
| | IPERF | /AMPZIJ/ |
| | KSYMP | /AMPZIJ/ |
| | LSTSYS | /SYSFIL/ |
| | NDATBL | /PARTAB/ |
| | NYRSYM | /SEGMNT/ |
| | SIGMA | /AMPZIJ/ |
| | TEMP | /TEMPO1/ |
| | WAVLGH | /AMPZIJ/ |
| | WAVNUM | /AMPZIJ/ |
| | ZRATI | /AMPZIJ/ |

| 6. | CALLING ROUTINE: | | | |
|----|------------------|--|--|--|
| | TSKXQT | | | |
| 7. | CALLED ROUTINES: | | | |
| | ASSIGN | | | |
| | CLSFIL | | | |
| | CNTGND | | | |
| | CONVRT | | | |
| | ERROR | | | |
| | GETARG | | | |
| | GETGEO | | | |
| | GETSYM | | | |
| | LODSYM | | | |
| | PRTKJ | | | |
| | PUTSYM | | | |
| | REBLCK | | | |
| | SMATRX | | | |
| | STATIN | | | |
| | STATOT | | | |
| | SYMDEF | | | |
| | SYMMOD | | | |
| | SYMUPD | | | |
| | SYSCHK | | | |
| | WLKBCK | | | |
| | ZIJSET | | | |
| | | | | |
| | | | | |





- 1. NAME: ZIJSET (MOM)
- 2. PURPOSE: Sets up the complex interaction matrix in the array CM for method of moments interactions.
- 3. METHOD: The matrix elements representing the tangential component of the electric field at the center of segment i due to a unit current at the center of segment j and zero current at the center of all other segments (G_{ij}) are stored in the array CM (array TEMP). When sinusoidal interpolation is used, the current basis function for segment j extends onto segments connected to either end of j although it is zero at the center of these segments. Rather than integrating the entire support of the basis function for segment j in one operation, the code integrates the extent of segment j only, while integrating three functions simultaneously: the center of the basis function for segment j, and the ends of the basis functions for the adjacent segments. The resulting matrix values represent contributions to $G_{i,j}$ and other elements $G_{i,k}$, where k is any segment connected to segment j.

For a wire segment source point and a wire segment observation point, the electric field is computed by routine NTRPLT, which assumes that the source segment is located at the origin of a cylindrical coordinate system. Thus, the segments i and j have their centers at

$$\bar{\mathbf{r}}_{i} = \mathbf{x}_{i}\hat{\mathbf{x}} + \mathbf{y}_{i}\hat{\mathbf{y}} + \mathbf{z}_{i}\hat{\mathbf{z}}$$

$$\bar{r}_{j} = x_{j}\hat{x} + y_{j}\hat{y} + z_{j}\hat{z}$$

and the unit vectors in the direction of the segments are

$$\hat{i} = i_x \hat{x} + i_y \hat{y} + i_z \hat{z}$$

$$\hat{j} = j_x \hat{x} + j_y \hat{y} + j_z \hat{z}$$

A cylindrical coordinate system (ρ' , ϕ' , z') is defined with origin at r_j and with $\hat{z}' = \hat{j}$. The cylindrical coordinates of segment i in this coordinate system are computed as:

$$\bar{z}_{ij} = \left[(\bar{r}_i - \bar{r}_j) \cdot \hat{j} \right] \hat{j}$$

$$\bar{\rho}_{ij} = (\bar{r}_i - \bar{r}_j) - \bar{z}_{ij}$$

The coordinates are supplied by routine SEJCON to routine NTRPLT, which returns the contribution to the matrix elements stored in array CM. If a ground plane is present, NTRPLT is also called for the image of segment j and returns the field of the image segment modified by the reflection coefficient as computed in ZIJSET. The field of the image of segment j is added to the same matrix elements as the field of segment j by routine JNCSUM.

When the source and observation points are separated by at least RKH meters, a dipole field approximation is used. The electric field at the observation point shown in figure 1 is given by:

$$\bar{E}_{R}(\bar{R}) = \frac{I_{o}\Delta\eta}{2\pi R^{2}} \left[1 - \frac{j}{k\bar{R}}\right] e^{-jk\bar{R}} \cos \theta \hat{R}$$

$$\bar{E}_{\theta}(\bar{R}) = \frac{I_0 \Delta \eta}{4\pi R^2} \left[1 + j(kR - \frac{1}{kR}) \right] e^{-jkR} \sin \theta \, \hat{\theta}$$

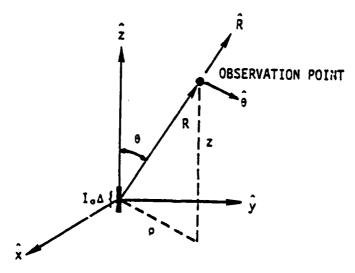


Figure 1. Geometry for Electric Field Calculation

The interaction terms are stored directly in the array CM.

For a wire source and a patch observation point, the magnetic field is evaluated by subroutine NTRPLT in a cylindrical coordinate system with the wire source at the origin. When a ground is present, NTRPLT is again called to calculate the field of the image of the source segment, which is multiplied by the reflection coefficient, and added to the direct field.

For a patch source, the tangential electric fields (wire observation point) and magnetic fields (patch observation point) are computed by a call to NTRPLU. When the patch source is connected to the obser-This will result in a vation segment, the ICON flag is nonzero. subsequent call to WYRPAT. In this subroutine, a special interpolation function is used for currents on the patches, and the fields are calculated by a more careful integration. The interaction at a patch observation point accounts for two columns in the CM array. This is due to the two unit currents t_1 and t_2 . When the source and observation patches coincide, a contribution of + 1/2 from the second term of equation 57 and the negative of equation 58 of the Engineering Manual are added to the CM array. If a ground plane is present, the field due to the patch image is computed. The matrix contribution of the image is added to the same matrix element as the source patch.

In all cases, when GTD interactions have been requested the shadowing matrix ISHADW is checked for source-observation path visibility. If the path is obstructed by a GTD geometry object, the MOM interaction is omitted.

4. INTERNAL VARIABLES:

| VARIABLE | DEFINITION |
|----------|---|
| AO | Cos θ for dipole approximation |
| A1 | Sin θ for dipole approximation |
| C1 | exp (-jkr) |
| CABI | Unit vector of observation segment in \boldsymbol{x} direction |
| CABJ | Unit vector of source segment in x direction |
| CM | Complex array for storing interaction matrix |
| СТН | Cosine of angle between the normal to ground and the reflecting ray from segment j to i |

| CURDIP | Magnitude of current used in dipole approx-imation |
|-----------|--|
| DIJ | Dot product of source and observation segment unit tangent vectors |
| DIK | Wire length from center of segment j to center of following segment for interpolation |
| DIL | Wire length from center of segment j to center of preceding segment for interpolation |
| DIR | Dot product of observation segment unit vector and source radius unit vector |
| DT | Difference in time from the last call by TICHEK |
| EP | The complex ρ component of electric field for the dipole approximation |
| EPI,EPR | The imaginary and real parts of ρ component of the electric field for the dipole approximation |
| ER | The complex radial component of the electric field for the dipole approximation |
| ET | The complex θ component of the electric field for the dipole approximation |
| ETA | $\sqrt{\mu/\epsilon} \simeq 376.7272$ ohms |
| ETI,ETR | Array containing imaginary and real parts of the contributions to the matrix elements |
| EWPI,EWPR | Array containing imaginary and real parts of the contributions to the matrix elements of a wire connected to a patch source. |
| EZ | The complex z component of the electric field for the dipole approximation |
| EZI, EZR | The imaginary and real parts of the z component of the electric field for the dipole approximation |

| FJ | $\sqrt{-1}$ |
|--------|---|
| FSIGN | One for end 2 of segment connected to a surface, -1 for end 1 of segment connected to a surface |
| FZI | Variable set to zero in calling GNDREF when using cylindrical coordinate system |
| FZR | Variable set to zero in calling GNDREF when using cylindrical coordinate system |
| I | Global column counter, used separately for wires and for patches |
| IALT | Flag indicating that the wire observation point is connected to a source patch |
| ICO1 | Connection data for end 1 of observation segment |
| ICO2 | Connection data for end 2 of observation segment |
| ICON | A flag indicating wire connected to a patch |
| IERRF | Error flag |
| IJ | <pre>(i - j) for wires, odd/even flag for patches</pre> |
| IK | 1 for wires, odd/even flag for patches |
| IP | DO loop index for actual source segment (=1) and if ground is present its image (=2) |
| IPATCH | A flag indicating a patch observation point |
| IPERF | Flag indicating a perfect ground |
| IPR | Local column counter |
| IPSEG | Index for observation segment with wire source |
| ISHADW | Array of packed words of observation-source segment numbers indicating the source-observation path is obstructed by a GTD geometry object |

| ISVP | Number of columns in interaction matrix for patch observation points already filled from previous calls to ZIJSET |
|--------|---|
| ISVW | Number of columns of interaction matrix for wire observation points already filled from previous calls to ZIJSET |
| ITYP | Flag indicating whether this segment is a source segment (-1) or an observation segment $(+1)$ |
| IWIRE | A flag indicating a wire source segment and that a local cylindrical coordinate system is used |
| J | DO loop variable determining row of CM being filled |
| J1, J2 | Row numbers for matrix elements corresponding to the source current components 1 and 2 |
| JBIAS3 | An integer to bias connection data to indi- cate a wire segment is connected to a patch |
| JC01 | Index of segment connected to end \boldsymbol{l} of segment \boldsymbol{j} |
| JCO2 | Index of segment connected to end 2 of segment \mathbf{j} |
| JPR | Shadow word for this source-observation pair |
| JS | An index pointing to location in segment table for a source segment |
| JSEG | Index for source segment |
| JSHAD | Pointer into the shadowing matrix |
| K | Local column counter for patch sources |
| K1, K2 | Column number for matrix elements corresponding to components 1 and 2 of observation segment |

KALL -A flag indicating number of times ZIJSET is

called

KC Saves NC for output

KONT An index locating position in EWPR and EWPI

arrays

KP Saves IP for output

KPR Saves IPR for output

KR Saves NR for output

KSEG Index for observation segment with patch

source

KSYMP Image flag

NC Number of columns of CM in core

NCOL Number of columns to be filled in present

call

NPATCH Total number of patches in segment table

NR Number of rows in CM in core

NROW Number of rows to be filled in present call

NSHAD Number of words in shadowing array

NWIRE Total number of wire segments in segment

table

PX X component of unit vector normal to plane

of incidence of ray from segment i to j

that reflects from ground plane

PY Y component of vector described under PX

R RMAG

 R^2

REFH The reflection coefficient for polarization

normal to the plane of incidence

REFV The reflection coefficient for polarization

in the plane of incidence

RFL Multiplier to change geometry of actual

segment to geometry of image

RH $\rho_{i,i}$

X,Y, and Z components of $\bar{\rho}_{i,j}/\rho_{i,j}$ RHOX, RHOY, RHOZ

RKH Separation distance in meters for elemen-

tary dipole interaction (= 1λ)

RKH1 kR

RKH1IN 1/RKH1

RMAG $|\bar{r}_i - \bar{r}_j|$

S Source segment length

SABI Unit vector of the observation segment in

the y direction

SABJ Unit vector of source segment in the y

direction

SALPI Unit vector of the observation segment in

the z direction

SALPJ Unit vector of the source segment in the z

direction

SALPR Reflected unit vector of the source segment

in the z direction

SETAC1 $\Delta \eta \exp(-jkr)$

The reflected z components of the unit vectors \hat{t}_1 and $\hat{t}_2,$ respectively T1ZJ, T2ZJ

TLEFT Time left

TNOW Current time

 $2\pi R^2$ **TPIRSO**

TSTART Time of previous call to TICHEK

X,Y, and Z location of observation point XI,YI,ZI

 $(x_1 - x_j); (y_1 - y_j); (z_1 - z_j)$ XIJ,YIJ,ZIJ

XJ,YJ,ZJ

X,Y, and Z location of source point

XYMAG

Magnitude of projection of $(\bar{r}_i - \bar{r}_j)$ on x-y plane

ZP

z_{ij} coordinate in cylindrical coordinate system

ZRATI

$$\left[\left(\frac{\varepsilon_1}{\varepsilon_o}\right)\left(1 - \frac{\sigma i}{\omega \varepsilon_1}\right)\right]^{-\frac{1}{2}}$$

Normalized complex ground plane impedance

ZRSIN

Quantity used in calculating ground reflection coefficients

5. I/O VARIABLES:

A. INPUT LOCATION

CABI

/AMPZIJ/

CABJ

/AMPZIJ/

DIK

/AMPZIJ/

DIL

/AMPZIJ/

ETA

/AMPZIJ/

ICO1

/AMPZIJ/

IC02

/AMPZIJ/

IP217

/GEODAT/

IPERF

/AMPZIJ/

ISHADW

F.P.

ISOFF

/ADEBUG/

ISON

/ADEBUG/

JBIAS3

/SEGMNT/

JC01

/SEGMNT/

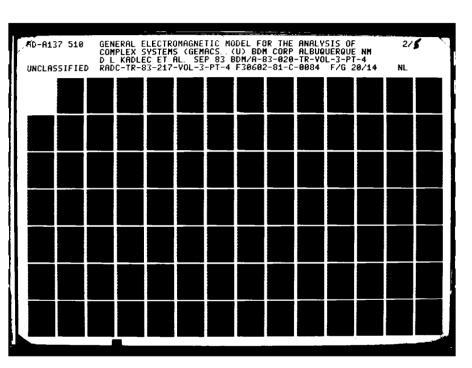
JC02 /SEGMNT/ JIX /JUNCOM/ JIZ /JUNCOM/ **JOX** /JUNCOM/ JOZ /JUNCOM/ KALL F.P. **KSYMP** /AMPZIJ/ **LSTSYS** /SYSFIL/ LUPRMT /ADEBUG/ MAXCON /JUNCOM/ NAMSEG /SEGMNT/ NCIX /JUNCOM/ NCIZ /JUNCOM/ NCOL F.P. NCOX /JUNCOM/ NCOZ /JUNCOM/ **NPATCH** /SEGMNT/ NROW F.P. **NSHAD** F.P. **NWIRE** /SEGMNT/ **NYRSYM** /SEGMNT/ RKH F.P. **RSTART** /SYSFIL/ S /AMPZIJ/ SABI /AMPZIJ/

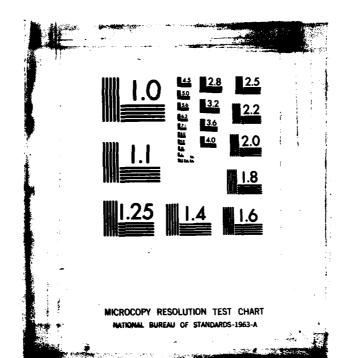
Action sections

| ZIJSET (M | 10M) |
|-----------|------|
|-----------|------|

| SABJ | /AMPZIJ/ |
|--------|----------|
| SALPI | /AMPZIJ/ |
| SALPJ | /AMPZIJ/ |
| SALPR | /AMPZIJ/ |
| TIMTGO | /SYSFIL/ |
| TWOPI | /AMPZIJ/ |
| WAVNUM | /AMPZIJ/ |
| XI | /AMPZIJ/ |
| ХJ | /AMPZIJ/ |
| YI | /AMPZIJ/ |
| YJ | /AMPZIJ/ |
| ZERO | /ADEBUG/ |
| ZI | /AMPZIJ/ |
| ZJ | /AMPZIJ/ |
| ZRATI | /AMPZIJ/ |
| OUTPUT | LOCATION |
| CM | F.P. |
| FJ | /AMPZIJ/ |
| IERRF | /ADEBUG/ |
| LSTSYS | /SYSFIL/ |
| PX | /AMPZIJ/ |
| PY | /AMPZIJ/ |
| REFH | /AMPZIJ/ |
| REFV | /AMPZIJ/ |
| RHOX | /AMPZIJ/ |

В.





The transfer of the second contract of the second

RHOY /AMPZIJ/

RHOZ /AMPZIJ/

RSTART /SYSFIL/

SALPR /AMPZIJ/

T1ZJ /AMPZIJ/

T2ZJ /AMPZIJ/

6. CALLING ROUTINE:

ZIJDRV

7. CALLED ROUTINES:

ASSIGN

CONVRT

ERROR

GNDREF

JNCSUM

NTRPLT

NTRPLU

SEJCON

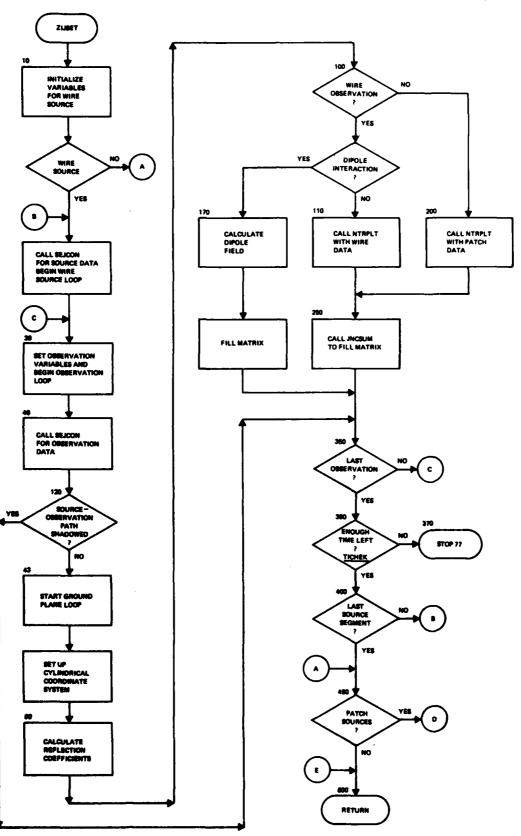
STATIN

STATOT

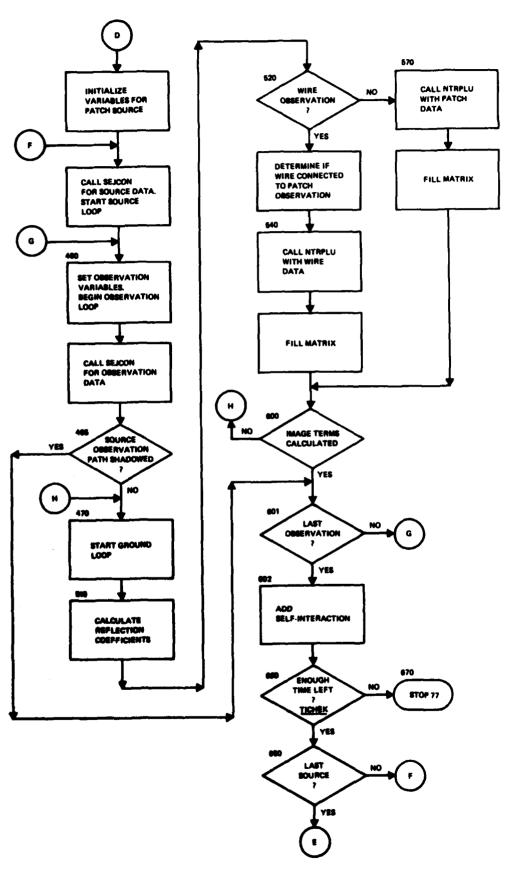
TICHEK

WLKBCK

Page 1 of 2



CONTROL OF THE PROPERTY OF THE



1346

territories.

- 1. NAME: ZINT (MOM)
- 2. PURPOSE: To compute the internal impedance of a circular wire with finite conductivity.
- 3. METHOD: The internal impedance per unit length of a circular wire is given by

$$z = \frac{i}{b} \sqrt{\frac{f\mu}{2\pi\sigma}} \left[\frac{Ber(q) + jBei(q)}{Ber'(q) + jBei'(q)} \right]$$

where

$$q = b\sqrt{2\pi f \mu \sigma}$$

 σ = wire conductivity

 μ = permeability of free space

b = wire radius

f = frequency

Ber. Bei = Kelvin functions

The term that modifies the diagonal matrix element $G_{\uparrow\uparrow}$ in the interaction matrix is the total impedance of segment i divided by $\Delta_{\uparrow}/\lambda$ where Δ_{\uparrow} = segment length. Thus, if $G_{\uparrow\uparrow}$ is the diagonal matrix element without loading, the new element is

$$G_{ii} - 2\Delta_i/(\Delta_i/\lambda) = G_{ii} - 2\lambda$$

Normalized to wavelength, this term is

$$z_i = z\lambda = \frac{j}{(b/\lambda)} \sqrt{\frac{c\mu}{2\pi(\sigma\lambda)}} \begin{bmatrix} \frac{Ber(q) + jBei(q)}{Ber'(q) + jBei'(q)} \end{bmatrix}$$

where

$$q = (b/\lambda) \sqrt{2\pi c \mu(\sigma \lambda)}$$

c = velocity of light

The Kelvin functions and derivatives of Kelvin functions are computed from their polynomial approximations (see reference A).

4. INTERNAL VARIABLES:

BER

ROLAM

| VARIABLE | DEFINITION |
|----------|-------------------|
| BEI | Bei(q) or Bei'(q) |

Ber(q) or Ber'(q)

BR2
$$Ber'(q) + jBei'(q)$$

CMOTP
$$c\mu/(2\pi)$$

CN $(1 + j)/\sqrt{2}$

PH
$$\Phi(X)$$
, D = 8/X (see reference A)

b/\

TH
$$\theta(X)$$
, (see reference A)

TPCMU
$$2\pi c\mu$$
, $c = velocity of light$

CONSTANTS:

 $1.5707963 = \pi/2$

 $3.141592654 = \pi$

 $6.283185308 = 2\pi$

 $60. = cu/2\pi$

 $2.368705E+3 = 2\pi c\mu$

(0., 1.) = j

 $(.70710678, .70710678) = (1 + j)/\sqrt{2}$

 $(.70710678, -.70710678) = limit for q + \infty of [Ber(q) + jBei(q)]/[Ber'(q) + jBei'(q)]$

Other constants are factors in the polynomial approximations.

5. I/O VARIABLES:

A. INPUT

LOCATION

ROLAM

F.P.

SIGL

F.P.

B. OUTPUT

LOCATION

ZINT

FUNCTION

6. CALLING ROUTINE:

LODDRY

7. CALLED ROUTINES:

NONE

- 8. REFERENCE:
 - A. <u>Handbook of Mathematical Functions</u>, M. Abramowitz, editor, National Bureau of Standards Applied Mathematics, Series 55, 1964, p. 384.

RETURN

1350

- 1. NAME: ZZXDUM (GTD, INPUT, MOM, OUTPUT)
- 2. PURPOSE: Dummy subroutine called to provide a program path through or around either nonexistent or undesired subroutines that may occur in the course of execution of a particular task.
- 3. METHOD: The subroutine name and arguments are transferred from the common INTARG array to the IWORDS array for printing. Printing will occur only if the DEBUG option is turned on for the print command (DBGPRT).
- 4. INTERNAL VARIABLES:

VARIABLE

DEFINITION

NAME

Left-justified alphameric name of subroutine for which ZZXDUM is being substituted

- 5. I/O VARIABLES:
 - A. INPUT

LOCATION

FLTARG

/ARGCOM/

INTARG

/ARGCOM/

LUPRNT

/ADEBUG/

NAME

F.P.

NUMARG

/ARGCOM/

B. OUTPUT

NONE

6. CALLING ROUTINES*:

DMPDRV (1,2,3,4)

EXCDRV (3)

TSKXQT (1,3)

ZCDRVR (3)

*1-INPUT

2-GTD

3-MDM

4-OUTPUT

ZZXDUM (GTD, INPUT, MOM, OUTPUT)

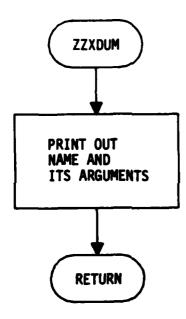
7. CALLED ROUTINES:

ASSIGN

STATIN

STATOT

WLKBCK



D. SYMBOL CROSS REFERENCE INDEX

1. GTD Module

| INDE | X | | •• | | JPER INDEX | ****** | | | | |
|------------|---|----------------|---------|-------------|------------|---|--------|--------|--------|--|
| SYMBOL | - | ******** | ****** | ROUTINES IF | WHICH THE | E SYMBOL IS USED ==================================== | | | | |
| A | - | TANG | SCICYL | SCLRPL | RPLSCL | RPLRCL | RFPTCL | RFDFPT | RFDFIN | |
| | | REFCYL | RCLRPL | RCLDPL | RADEV | NANDS | GTDDRV | GEOMPC | JNCF | |
| | | FRNELS | FKY | FKARG | FCT | ENDIF | DZCOEF | DQG32 | DPLRCL | |
| | | 0PI | DICOEF | DFRFPT | DFPTCL | CYLINT | CAPINT | | | |
| AA | - | TANG | GTDDRV | | | | | | | |
| ABS | - | SOURCP | SOURCE | SCTCYL | SCLRPL | RPLSCL | RPLRCL | RPLDPL | ROMBNT | |
| | | RFPTCL | RFDFPT | REFCYL | REFBP | RCLRPL | QFUN | PUTKWV | POLYRT | |
| | | PLAINT | PFUN | GTDDRV | GETGEO | GEOMPC | GEOMC | GEOM | FLDDRV | |
| | | FKY | FKARG | FFCT | FCT | EXCDRV | ESPARM | ENDIF | DZCOEF | |
| | | DPLRPL | DPI | DIFPLT | DICOEF | DFRFPT | DFPTWD | DFPTCL | CNVTST | |
| | | BTANZ | BABS | | | | | | | |
| ACOS | - | XYZFLD | RPLOPL | RCLRPL | NFD | GTDDRV | ENDIF | DPLRPL | DIFPLT | |
| ACS | - | DPI | DICOEF | | | | | | | |
| ACTHP | - | SOURCP | SOURCE | | | | | | | |
| ADDOPR | - | DAPDRV | | | | | | | | |
| ADEBG | - | RWCOMS | | | | | | | | |
| ADN | - | RPLDPL | DPLRPL | DIFPLT | | | | | | |
| AE | - | ENDIF | DFPTCL | CAPINT | | | | | | |
| AFN | - | RPLDPL | DPLRPL | DIFPLT | | | | | | |
| AIMAG | - | ZGTDRV | SCTCYL | SCLRPL | RPLSCL | RPLRPL | RPLDPL | RFDF1N | REFPLA | |
| | | REFCAP | RCLDPL | POLYRT | INCFLD | ENDIF | DPLRPL | DPLRCL | DIFPLT | |
| •• | | BEXP | BABS | | | | | | | |
| AL | - | TANG | | | | | | | | |
| AL06 | - | ROMENT | | | | | | | | |
| AL0610 | - | 9L0G10 | | | | | | | | |
| ALPHA | - | SCTCYL | SCLRPL | RPLSCL | | | | | | |
| ALR | - | SCTCYL | SCLRPL | RPLSCL | FKARG | | | | | |
| ALRS | - | SCICYL | SCLRPL | RPLSCL | | | | | | |
| ALS | - | SCTCYL | SCLRPL | RPLSCL | | | | | | |
| AM | - | REDEPT | | | | | | | | |
| AMA X 1 | - | SCICYL | SCLRPL | RPLSCL | | | | | | |
| AMC | - | afun | PFUN | | | | | | | |
| AMINT | _ | SCTCYL | SCLRPL | RPLSCL | | | | | | |
| AMOD | - | SOURCE | FRNELS | BEXP | | | | | | |
| LSPMA | - | RYCOMS | 061.001 | | | | | | | |
| AN | - | SCLRPL | RCLRPL | PLAINT | IMAGE | GEOMC | GEOM | DPLRPL | CAPINT | |
| ANG | - | DPI | DICOEF | | | | | | | |
| ANI | - | GEOM | | | | | | | | |
| ANN | - | GEOM | | | | | | | | |
| ANP | - | GEOM SCLRPL | 9C1 991 | | | | | | | |
| ANR ANS | - | FKARG | RCLRPL | | | | | | | |
| ANUMK | _ | SEJCON | INTPLT | | | | | | | |
| ARURL | - | SEJCON | INTPLT | | | | | | | |
| AP | - | XYZFLD | DZCOEF | | | | | | | |
| AQ | - | QFUN | PFUN | | | | | | | |
| AREA | - | ZGTDRV | SEJCON | | | | | | | |
| ARG | _ | BEXP | 5.5.51 | | | | | | | |
| ***** | | w w n r | | | | | | | | |

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O

INDEX ******* SUPER INDEX ******* RWCOMS ARGCM ARGI BEXP ARG11 BEXP ARGR BEXP AS SCTCYL SCLRPL RPLSCL GTDDRV WRTFIL ASSIGN ZZXDUM ZIJDRV ZGTDRV WRICHK TSKXQT SYSRIN SYSCHK SYMUPD SYMDEF STRTUP SOURCP SOURCE SET SEJCON SCICYL RPLRPL RPLRCL RWCOMS RPLSCL RPLDPL ROTATE SCLRPL RWFILS ROMBNI RESTRT REFPLA REFCYL REFCAP RDEFIL RCLRPL RCLDPL PUTSYM PUTSEG PUTKWV PRIKJ POSTIP OPNFIL MOVFIL MAIN JNCSUM INTPLT INCFLD IBITCK GTDDRV GETSYM GETSEG GETKWV GETFLD GETARS FNDREC FLDDRV **ESPARM** GETKWD GETGEO EXCDRV DIFPLT DMPDRV CYAXIS ENDIF DPLRPL DPLRCL AT XYZFLD ATANZ **ESPARM** BTAN2 AXCL GIDDRY AYCL GIDDRY AZCL GTDDRV A1 SCLRPL RCLRPL DPLRPL A11 ROTATE 412 ROTATE A13 ROTATE **A2** SCLRPL RCLRPL DPLRPL A21 ROTATE AZZ ROTATE A23 ROTATE 43 SCLRPL RCLRPL DPLRPL A31 ROTATE **A32** ROTATE A33 ROTATE A SEJCON SCICYL SCLRPL RPLSCL RPLRCL RFPTCL ZGTDRV TANG RFDFPT RFDFIN REFCYL RCLRPL RCLDPL RADCV NANDB GTDDRV FUNI GEOMPC FRNELS FKARG FCT ENDIF D Q G 3 2 DPLRCL DFRFPT DFPTWD DFPTCL CYLINT CAPINT BABS POLYRT DICOEF DFPTCL 88 TANG GTDDRV BCD RFDFPT RCLOPL GEOMPC BD GEOM DPLRCL DEPTWO BDEL DFPTWD BDHI DFPTWD BOLOW DICOEF BET TANG DPI BETN RPLDPL DW DPLRPL DIFPLT DIFPLT BETP RPLDPL DW DPLRPL RPLDPL REFPLA REFCYL BEXP SCTCYL SCLRPL RPLSCL RPLRPL RPLRCL REFCAP RCLRPL RCLDPL QFUN PFUN INCFLD FKY FFCT DPI DIFPLT DICOEF ENDIF DZCOEF DPLRPL DPLRCL BJ SCICYL SCLRPL RPLSCL 8K SOURCE ROMBNT CYLINT

| INDE | E X | | | | | | | | |
|--------|-----|--------|------------------|---------|------------|--------|--------|--------|---------|
| | | | •• | ****** | UPER INDEX | ****** | • | | |
| 80 | _ | RPLDPL | | | | | | | |
| BOP | - | SOURCE | RCLDPL | DPLRPL | DPLRCL | DIFPLT | | | |
| BOT | - | GEOM | RPLDPL | RCLDPL | DPLRPL | DPLRCL | DIFPLT | | |
| BOTL | _ | DPI | DICACE | | | | | | |
| BPL | - | CYLINT | DICOEF | | | | | | |
| BRD | - | RPLDPL | 050501 | | | | | | |
| 850 | - | DFRFPT | RFDFPT | DPLRPL | DIFPLT | DFPTWD | | | |
| 81 | _ | TANG | | | | | | | |
| BTANZ | - | XYZFLD | TANC | | | | | | |
| | | RFDFPT | TANG | SCTCYL | SCLRPL | RPLSCL | RPLRCL | RPLDPL | RFPTCL |
| | | GTDDRV | RFDFIN Geompc | REFCYL | REFBP | RCLRPL | RCLDPL | PLAINT | NFD |
| | | CYLINT | CAPINT | GEOM | ENDIF | DPLRPL | OPLRCL | DIFPLT | DEPTWD |
| BTCN | _ | GEOMPC | GEOM | | | | | | |
| BTCP | _ | GEOMPC | GEOM | | | | | | |
| 810 | - | CALINA | GEUM | | | | | | |
| BTDC | - | GEOMPC | DPLRCL | | | | | | |
| 911 | _ | RPLSCL | RPLRCL | 00000 | | | | | |
| BTS | - | SCICYL | SCLRPL | RFPTCL | GEOMPC | | | | |
| 9x | _ | SCTCYL | SCLRPL | RFPTCL | REFCYL | RCLRPL | GEOMC | CYLINT | |
| 84 | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| 8Z | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| 82 | - | FCT | SCCRPL | RPLSCL | | | | | |
| c | - | a FUN | POLYRT | 0.5 | | | | | |
| | | DICOEF | DFPTCL | PFUN | FRNELS | FKY | DQG32 | DPI | DMPDRV |
| CA | - | RFDFIN | OTPTCL | | | | | | |
| IBAD | - | ZGTDRV | SEJCON | | | | | | |
| CABJ | - | ZGTDRV | SEJCON | | | | | | |
| CABS | - | GTDDRV | BABS | | | | | | |
| CAPINT | - | REFCAP | GEOMC | CV1 141 | | | | | |
| CAS | - | SCLRPL | GTDDRY | CYLINT | | | | | |
| CBO | _ | ENDIF | 0.0547 | | | | | | |
| CC | _ | POLYRT | FRNELS | DFPTCL | | | | | |
| CCC | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| CCDKS | - | SOURCP | SECRE | KPC 3CC | | | | | |
| CCIV | - | DEREPT | | | | | | | |
| CCU | - | RFDFPT | | | | | | | |
| CCV | - | REDEPT | | | | | | | |
| CCS | - | FLDDRY | | | | | | | |
| CC3 | - | FLDDRV | | | | | | | |
| CDKS | - | SOURCP | SOURCE | | | | | | |
| CEXP | - | BEXP | | | | | | | |
| CF | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| CFH | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| CFR | - | FFCT | | u.r.are | | | | | |
| CFS | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| CHKPNT | • | VAGLIS | ZGTDRV | WRIFIL | Unterr | | | | |
| | | SYMBEF | STRTUP | STATEN | WRTCHK | MLKBCK | TSKXQT | TRCEBK | SYSCHK |
| | | MAIN | GETSYM | GETKWV | RESTRT | RDEFIL | PUTSYM | PUIKWV | OPNFIL |
| CHKWRT | - | ZIJDRV | ZGTDRV | WRIFIL | FLDDRV | ERROR | BLKDAT | ASSIGN | |
| | | SYMDEF | STRTUP | | WRTCHK | WLKBCK | TSKXQT | TRCESK | SYSCHK |
| | | | | STATFN | RESTRT | RDEFIL | PUTSYM | DUTYJU | 004.5.4 |

INDFX

| ****** SUPER INDEX ***** | | | | | | | | | | | |
|--------------------------|---|--------|--------|--------|--------|--------|--------|--------|--------|--|--|
| | | MAIN | GETSYM | GETKWV | FLDDRV | ERROR | BLKDAT | ASSIGN | | | |
| CI | - | FLOORV | | | | | | | | | |
| CINT | - | SOURCE | | | | | | | | | |
| CIUE | - | DEREPT | | | | | | | | | |
| CIV | - | DERFPI | | | | | | | | | |
| CIVE | - | DFRFPT | | | | | | | | | |
| CJ | - | SOURCP | SOURCE | SCTCYL | SCLRPL | RPLSCL | INCFLD | GTDDRV | ENDIF | | |
| | | DZCOEF | BLDATA | BEXP | | | | | | | |
| CK | • | INTPLT | | | | | | | | | |
| CL | - | INTPLT | | | | | | | | | |
| CLITE | - | ZIJDRV | PUTKWV | EXCDRV | BLKDAT | | | | | | |
| CLOG | - | DFPTCL | | | | | | | | | |
| CLSFIL | - | WRICHK | SYMDEF | STATEN | RWFILS | PUTSYM | OPNFIL | ERROR | DMPDRV | | |
| CM | - | ZGTDRV | JNCSUM | | | | | | | | |
| DAKS | - | DMPDRV | | | | | | | | | |
| CMAX | - | POLYRT | | | | | | | | | |
| CMPLX | - | SOURCE | SCTCYL | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | RFDFIN | | |
| | | REFPLA | REFCYL | REFCAP | RCLRPL | RCLDPL | QFUN | POLYRT | PFUN | | |
| | | JNCSUM | INCFLD | FKY | FFCT | ESPARM | ENDIF | DZCOEF | DPLRPL | | |
| | | DPLRCL | DPI | DIFPLT | DICOEF | DFPTCL | | | | | |
| CMPLXT | - | DMPDRV | | | | | | | | | |
| CMPLX2 | - | DMPDRV | | | | | | | | | |
| CNC | - | REFCAP | GTDDRV | GEOMC | ENDIF | DFPTCL | CAPINT | | | | |
| CNDK2 | - | SOURCP | | | | | | | | | |
| CNEW | - | POLYRT | | | | | | | | | |
| CNIN | | GEOMPC | | | | | | | | | |
| CNIP | - | GEOMPC | | | | | | | | | |
| CNNW | - | POLYRT | | | | | | | | | |
| CNP | - | RPLDPL | RCLDPL | DPLRPL | DPLRCL | DIFPLT | | | | | |
| CNSLIO | - | WRTCHK | | | | | | | | | |
| CNYTST | - | ROMBNT | | | | | | | | | |
| CO | - | NTGRAN | | | | | | | | | |
| COINC | - | SOURCE | | | | | | | | | |
| COM | - | DPI | DICOEF | | | | | | | | |
| COMPLT | - | ZIJDRV | ZGTDRV | WRTFIL | WRTCHK | MFKBCK | TSKXQT | TRCEBK | SYSCHK | | |
| | | SYMDEF | STRTUP | STATFN | RESTRT | RDEFIL | PUTSYM | PUTKWV | OPNFIL | | |
| | | MAIN | GETSYM | GETKWV | FLDDRV | ERROR | BLKDAT | ASSIGN | | | |
| COMSAV | - | SYSCHK | | | | | | | | | |
| CONJE | - | RFDFIN | POLYRT | FKY | DFPTCL | | | | | | |
| CONS | - | INTPLT | | | | | | | | | |
| CONST | - | SOURCP | SOURCE | | | | | | | | |
| CONVRT | - | ANDERA | TSKXQT | SYMUPD | SYMDEF | RWFILS | RESTRT | PUTSYM | PUTKWV | | |
| | | PRTKJ | POSTIP | GETSYM | GETKWV | GETGEO | GETARG | FNDREC | FLDDRV | | |
| | | EXCORV | DMPDRV | | | | | | | | |
| COP1 | • | DMPDRV | | | | | | | | | |
| COP2 | • | DMPDRV | | | | | | | | | |
| CORN | • | RPLOPL | DPLRPL | DIFPLT | | | | | | | |
| cos | - | XYZFLD | TPNFLD | TANG | SOURCP | SOURCE | SCTCYL | SCLRPL | RPLSCL | | |
| | | RPLRPL | RPLRCL | RPLOPL | ROTATE | RFPTCL | RFDFPT | RFDFIN | REFPLA | | |
| | | REFCYL | REFBP | RCLRPL | RCLOPL | RADCV | NTGRAN | EDNAK | INTPLT | | |

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| | | GTDDRV | GETFLD | GEOMPC | FUNI | FRNELS | FCT | ESPARM | ENDIF |
| | | DZCOEF | DPLRPL | DPLRCL | DPI | DIFPLT | DICOEF | DFRFPT | DFPTCL |
| | | CYLINT | CAPINT | | | | | | |
| COSETA | - | ESPARM | | | | | | | |
| COSK | - | ENTPLT | | | | | | | |
| COSL | - | INTPLT | | | | | | | |
| COSP | - | ESPARM | | | | | | | |
| COST | - | ESPARM | | | | | | | |
| COTA | - | DICOEF | | | | | | | |
| COTB | - | RFDFPT | | | | | | | |
| CP | - | XYZFLD | ROTATE | PLAINT | | | | | |
| CPCS | - | RFDFPT | DFRFPT | | | | | | |
| CPDC | - | GEOMPC | DFRFPT | | | | | | |
| CPE | - | ENDIF | | | | | | | |
| CPFRWD | - | ZIJDRV | ZGTDRV | WRTFIL | WRTCHK | AFKSCK | ISKXQT | TRCEBK | SYSCHK |
| | | SYMDEF | STRTUP | STATFN | RESTRT | RDEFIL | PUTSYM | PUTKWV | OPNFIL |
| • | | MIAM | GETSYM | GETKWV | FLDDRY | ERROR | BLKDAT | ASSIGN | |
| CPH | - | SOURCE | RPLDPL | RCLEPL | DPLRPL | DPLRCL | DIFPLT | | |
| CPHI | - | RPLRPL | RPLRCL | REFPLA | | | | | |
| CPHJ | - | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | RCLRPL | DPLRPL | |
| CPHO | - | RPLDPL | RCLDPL | DPLRPL | DPLRCL | DIFPLT | | | |
| CPHP | - | SOURCP | SOURCE | | | | | | |
| CPHS | - | SOURCE | | | | | | | |
| 1.PI4 | - | SOURCP | SCTCYL | SCLRPL | RPLSCL | INCFLD | GTDDRV | ENDIF | BLDATA |
| 600 | | BEXP | | | | | | | |
| CPO C P OP | - | RFDFPT | | | | | | | |
| CPP | - | RFDFPT RFPTCL | | | | | | | |
| CPS | - | SCICYL | 001 551 | 001.001 | 050761 | 5226 VI | 05500 | CTARRY | 501 BC1 |
| CPS | _ | CYLINT | RPLSCL | RPLRCL | RFPTCL | REFCYL | REFOP | GTDDRV | DPLRCL |
| CPS 1 | - | RPLACE | REFCYL | | | | | | |
| CPS2 | - | RPLACE | REFCYL | | | | | | |
| CR | - | FLODRY | HEFEIL | | | | | | |
| CRK | • | NTGRAN | | | | | | | |
| CRPV | • | DFRFPT | | | | | | | |
| CRUR | - | RFDFPT | | | | | | | |
| CRUY | - | RFDFPT | | | | | | | |
| CRV | - | RFDFPT | | | | | | | |
| CRVR | _ | REDEPT | | | | | | | |
| CRYV | _ | RFDFPT | | | | | | | |
| CRI | _ | SOURCE | | | | | | | |
| CRIR | - | SOURCE | | | | | | | |
| CRIRR | - | SOURCE | | | | | | | |
| CMS | - | SOURCE | | | | | | | |
| CRZR | - | SOURCE | | | | | | | |
| CRERR | • | SOURCE | | | | | | | |
| CS | - | ROTATE | FCT | | | | | | |
| CSAS | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| CSCA | • | DPI | | | | | | | |
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| CSCR | - | DFRFPT | | | | | | | |
| CSP | _ | DZCOEF | | | | | | | |
| CSQRT | - | POLYRT | DZCOEF | | | | | | |
| CST | - | SOURCE | 02000. | | | | | | |
| CSTM | _ | RUCOMS | | | | | | | |
| CSV | - | RPLRCL | RFPTCL | RFDFPT | RFDFIN | REFCYL | RCLRPL | | |
| css | - | FCT | | | | REVETE | RECREE | DFRFPT | |
| CT | - | XYZFLD | ROTATE | | | | | | |
| CTB | - | DFPTWD | | | | | | | |
| CTBP | - | RFDFPT | | | | | | | |
| CTBT | - | RFDFPT | | | | | | | |
| CTC | - | SCTCYL | SCLRPL | RPLSCL | RPLRCL | REFCYL | RCLRPL | RCLOPL | GTDDRV |
| | | GEOMPC | ENDIF | DPLRCL | DFPTCL | CYLINT | _ | | |
| CTCS | - | RFDFPT | DFRFPT | | | | | | |
| CTE | - | ENDLF | | | | | | | |
| CTH | - | SOURCE | RPLDPL | DPLRPL | DIFPLT | | | | |
| CTHC | - | RCLDPL | DPLRCL | | | | | | |
| CTHI | - | DPLRCL | 221 221 | | | | | | |
| CTHJ | - | RPL RPL SCL RPL | RPLRCL | REFPLA | REFCYL | ENDIF | | | |
| CTHM | • | RPLDPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | RCLRPL | DPLRPL | |
| CTHP | - | SOURCE | DPLRPL Source | DIFPLT | | | | | |
| CTHS | - | SOURCE | SCICYL | RPLDPL RPLSCL | DPLRPL | DIFPLT | | | |
| CTHW | - | RPLRCL | RCLRPL | MFLSCL | RPLRCL | REFCYL | GTDDRV | | |
| CTO | - | RFDFPT | NEENTE | | | | | | |
| CTOP | - | RFDFPT | | | | | | | |
| CTS | - | REFBP | | | | | | | |
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| CV | - | TANG | ENDIF | DFPTCL | | | | | |
| CVAL | - | CYAXIS | BLKDAT | | | | | | |
| CAE | - | TANG | CYLINT | CAPINT | | | | | |
| CVXD | - | RCLOPL | | | | | | | |
| CVXMP | - | RCLDPL | | | | | | | |
| CVXMP1 | - | RCLDPL | | _ | | | | | |
| CM | _ | RPLRCL | REFCYL | RCLRPL | RCLDPL | | | | |
| CX CXRUE | - | CANXIS | BLKDAT | | | | | | |
| CXRUI | - | DFRFPI | | | | | | | |
| CXRVE | - | DFRFPT DFRFPT | | | | | | | |
| CXRVI | - | DFRFPT | | | | | | | |
| CXRI | - | RCLDPL | | | | | | | |
| CXR2 | - | RCLOPL | | | | | | | |
| CYAXIS | - | GTDDRY | | | | | | | |
| CYLINT | • | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | REFPLA | 861 881 | 861.551 |
| | | INCFLD | GTDDRV | GEOM | DPLRPL | DPLRCL | DIFPLT | RCLRPL | RCLDPL |
| C1 | • | FLODRY | | | ~. <u>~</u> | U. 2006 | V11761 | | |
| C11 | • | SCLRPL | RCLRPL | DPLRPL | | | | | |
| CTTA | • | DPLRPL | | _ | | | | | |
| C12 | - | SCLRPL | RCLRPL | DPLRPL | | | | | |
| C12A | - | BPI PPI | | | | | | | |

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| C21 | - | SCLRPL | RCLRPL | DPLRPL | | | | | |
| CZTA | - | DPLRPL | | | | | | | |
| CSS | - | SCLRPL | RCLRPL | DPLRPL | | | | | |
| CSSV | - | DPLRPL | | | | | | | |
| C3 | - | FLDDRV | | | | | | | |
| D | - | XYZFLD | SCTCYL | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | RFDFPT |
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| | | GTDDRV | FRNELS | FLDDRV | EXCDRV | ENDIF | DPLRPL | DPLRCL | DIFPLT |
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| DAY | - | RFDFPT | | | | | | | |
| DAZ | - | RFDFPT | | | | | | | |
| 986PRT | - | ZZXDUM | ZIJDRV | ZGTDRV | WRTFIL | WRTCHK | MLKBCK | TSKXQT | TRCEBK |
| | | TANG | SYSRIN | SYSCHK | SYMUPD | SYMDEF | STRTUP | STATOT | STATIN |
| | | STATFN | SOURCP | SOURCE | SHELL | SET | NOJLJZ | SCICYL | SCLRPL |
| | | RWFILS | RWCOMS | RPLSCL | RPLRPL | RPLRCL | RPLOPL | ROTATE | ROMBNT |
| | | RFPTCL | RFDFPI | RESTRT | REFPLA | REFCYL | REFCAP | REFBP | RDEFIL |
| | | RCLRPL | RCLDPL | PUTSYM | PUTSEG | PUTKWV | PRTKJ | POSTIP | POLYRT |
| | | OPNFIL | NTGRAN | MOVFIL | MAIN | JNCSUM | INTPLT | INCFLD | IBITCK |
| | | GTDDRV | GETSYM | GETSEG | GETKWV | GETKWD | GETGEO | GETFLD | GETARG |
| | | GEOM | FNDREC | FLDDRV | EXCDRV | ESPARM | ERROR | ENDIF | DPLRPL |
| | | DPLRCL | DMPDRV | DIFPLT | DFRFPT | CYAXIS | CONVRT | CLSFIL | BTANZ |
| | | BLKDAT | ASSIGN | | | | | | |
| DBGSAV | - | ZIJDRV | | | | | | | |
| OBI | - | PLAINT | | | | | | | |
| DBT | - | PLAINT | | | | | | | |
| DC | • | RFDFPT | FLODRY | | | | | | |
| DCP | - | RFDFPT | | | | | | | |
| DCT | - | RFDFPT | | | | | | | |
| DD | - | RPLRCL | RFPTCL | REFCYL | RCLRPL | RCLDPL | DPLRCL | DFPTCL | |
| DDC | - | GEOMPC | DPLRCL | DFRFPT | | | | | |
| DDC 1 | - | DFRFPT | | | | | | | |
| DDCS | • | DFRFPT | | | | | | | |
| DDDV | - | RFDFPT | | | | | | | |
| DDPV | - | RFDFPT | | | | | | | |
| DDRY | - | RFDFPT | | | | | | | |
| DDTV | - | RFDFPT | | | | | | | |
| 9 0 V | - | RFDFPT | | | | | | | |
| 991 | • | RPLRCL | REFCYL | RCLRPL | DPLRCL | CYLINT | | | |
| 200 | - | RPLRCL | REFCYL | RCLRPL | DPLRCL | CALINA | | | |
| DE | - | RFDFPT | DFRFPT | | | | | | |
| DEEX | ~ | DFPTCL | | | | | | | |
| DEEY | • | DFPTCL | | | | | | | |
| DEES | - | DFPTCL | | | | | | | |
| DEL | • | RPLDPL | FFCT | DPLRPL | DIFPLT | DICOEF | DFPTCL | | |
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| 928 | • | DP1 | DICOEF | | | | | | |

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RPLOPL

DICH

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| DVT | - | RFPTCL | | | | | |
| 0V1 | - | TANG | | | | | |
| DAS | - | TANG | | | | | |
| DW | • | RPLDPL | RCLDPL | DPLRPL | DPLRCL | DIFPLT | |
| DX | - | SOURCE | RFPTCL | | | | |
| DXF | - | RFDFPT | | | | | |
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| DY | - | RFPTCL | POLYRT | | | | |
| DYP | - | RFDFPT | | | | | |
| DZ | - | ROMBNI | | | | | |
| DZCOEF | - | ENDIF | | | | | |
| PZOT | - | ROMBNT | | | | | |
| DZP | - | RFDFPT | | | | | |
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| ECPH | - | RPLDPL | DPLRPL | DIFPLT | | | |
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| ECTH | - | RPLDPL | DPLRPL | DIFPLT | | | |
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| EDPCIN | - | STOORY | | | | | |
| | - | | RCLOPL | | | | DIFPLT |
| EPPH | - | RPLDPL ENDIF | WLLDPL | ENDIF | PPLRPL | DPLRCL | DIFFE |
| EDPHA EDPHG | - | ENDIF | | | | | |
| EDPL | - | RPLOPL | RCLOPL | | | DIFPLT | |
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| EDPPH | - | GTOORY | | | | | |
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| EPPTH | - | GTOORY | HLLDPL | C4011 | DPLRPL | J-CHCC | MILLET |
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| EEY | - | DFPTCL | | | | | | | | | | | |
| EEZ | - | DFPTCL | | | | | | | | | | | |
| EF | - | SCTCYL | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | REFPLA | REFCYL | | | | |
| | | REFCAP | RCLRPL | RCLOPL | ENDIF | DPLRPL | DPLRCL | DIFPLT | | | | | |
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| EFB | - | SOURCP | | | | | | | | | | | |
| EFC | - | OPLRPL | | | | | | | | | | | |
| EG | - | SCTCYL | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | REFPLA | REFCYL | | | | |
| | | REFCAP | RCLRPL | RCLDPL | ENDIF | DPLRPL | DPLRCL | DIFPLT | | | | | |
| EGE | - | DPLRPL | | | | | | | | | | | |
| EHI | - | ZGTDRV | | | | | | | | | | | |
| EHP | - | SCICYL | SCLRPL | RPLSCL | | | | | | | | | |
| EHPH | - | SCTCYL | REFCYL | | | | | | | | | | |
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| EHT | - | ZGTDRV | SCTCYL | SCLRPL | RPLSCL | | | | | | | | |
| ENTH | - | SCICYL | REFCYL | | | | | | | | | | |
| ENTHI | - | RPLSCL | RPLRCL | | | | | | | | | | |
| LHTHJ | - | SCLRPL | RCLRPL | | | | | | | | | | |
| EIPH | - | SCTCYL | SCLRPL | RPLSCL | GTDDRV | | | | | | | | |
| EIPL | - | RPLDPL | RCLDPL | DPLRPL | DPLRCL | DIFPLT | | | | | | | |
| EIPLP | • | SOURCP | RPLDPL | DPLRPL | DIFPLT | | | | | | | | |
| EIPP | • | RPLRCL | REFCYL | RCLRPL | ENDIF | | 5 N S I S | DPLRPL | DPLRCL | | | | |
| EIPR | • | RPLRCL | RPLDPL | REFCYL | RCLRPL | RCLDPL | ENDIF | DPCKPC | DFLACE | | | | |
| | _ | DIFPLT | | | DIFPLT | | | | | | | | |
| EIPRP | - | SOURCP | RPLDPL | DPLRPL | GTDDRV | | | | | | | | |
| EITH | - | SCICYL | SCLRPL | RPLSCL RPLSCL | RPLRPL | RPLDPL | REFPLA | REFCAP | RCLDPL | | | | |
| EIX | _ | SCTCYL FND1F | SCLRPL DPLRPL | DPLRCL | DIFPLT | RFEUFE | KETTEN | KETENT | #CC C | | | | |
| EIY | • | SCICYL | SCLRPL | RPLSCL | RPLRPL | RPLDPL | REFPLA | REFCAP | RCLDPL | | | | |
| 811 | _ | ENDIF | DPLRPL | DPLRCL | DIFPLT | M. Co. C | WC1. C. | | | | | | |
| ElZ | - | SCICYL | SCLAPL | RPLSCL | RPLRPL | RPLBPL | REFPLA | REFCAP | RCLDPL | | | | |
| | _ | ENDIF | DPLRPL | DPLRCL | DIFPLT | W. 65. 5 | WE11 G. | | | | | | |
| EL1 | - | ROMBNT | 5.6 | 5. 4 | ••••• | | | | | | | | |
| Er S | • | ROMBNT | | | | | | | | | | | |
| EM | - | ESPARM | ENDIF | | | | | | | | | | |
| BARS | • | DFPTWD | • | | | | | | | | | | |
| ENDLF | - | GIDDRY | | | | | | | | | | | |
| END 1 | - | SEJCON | | | | | | | | | | | |
| ENDZ | - | SEJCON | | | | | | | | | | | |
| ENORM | • | GEOMC | GEOM | | | | | | | | | | |
| EP | - | XYZFLD | SOURCP | SCTCYL | SCLRPL | RPLSCL | ROMBNT | | | | | | |
| EPH | - | RPLRCL | REFCYL | REFCAP | RCLRPL | INCFLD | GTDDRV | FLDDRV | | | | | |
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| EPS | - | POLYRT | | | | | | | |
| EPSQ | • | DFPTCL | | | | | | | |
| EPSR | - | ZIJDRV | PUTKWV | GETKWV | BLKDAT | | | | |
| EPT | - | SOURCP | | | | | | | |
| EPX | - | ESPARM | | | | | | | |
| EPY | - | ESPARM | | | | | | | |
| EPZ | - | ESPARM | | | | | | | |
| ER | - | SOURCE | SCTCYL | SCLRPL | RPLSCL | | | | |
| ERC | - | RFPTCL | RFDFPT | DFRFPT | | | | | |
| ERCA | - | RFPTCL | RFDFPT | DFRFPT | | | | | |
| ERCAP | - | GTOORV | | | | | | | |
| ERCAT | - | GTDDRV | | | | | | | |
| ERCB | - | RFDFPT | DFRFPT | | | | | | |
| ERCPP | - | GTDDRV | | | | | | | |
| ERCPT | • | GTDDRV | | | | | | | |
| ERD | - | REFBP | | | | | | | |
| ERDPH | - | GTDDRV GTDDRV | | | | | | | |
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| ERIS | - | SOURCE | | | | | | | |
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| ERPDP | - | GTDDRV | | | | | | | |
| ERPOT | • | GTODRY | | | | | | | |
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| ERZ | - | RPLRCL | REFCYL | RCLRPL | RCLDPL | DPLRCL | | | | | | |
| ESP | - | SCICYL | SCLRPL | RPLSCL | | | | | | | | |
| ESPARM | - | GETFLD | | | | | | | | | | |
| ESPH | - | SCICYL | REFCYL | GTDDRV | | | | | | | | |
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| ESPHJ | - | SCLRPL | RCLRPL | | | | | | | | | |
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| ESTH | - | SCICYL | REFCYL | GTDDRV | | | | | | | | |
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| ESTHJ | - | SCLRPL | RCLRPL | | | | | | | | | |
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| ESY | - | ESPARM | | | | | | | | | | |
| ESZ | - | ESPARM | | | | | | | | | | |
| ET | ~ | XYZFLD | SYSCHK | SOURCP | SCTCYL | SCLRPL | RPLSCL | | | | | |
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| ETHT | - | GIDDRV | | | | | | | | | | |
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| ETIME | - | SYSCHK | | | | | | | | | | |
| ETP | - | SOURCP | | | | | | | | | | |
| ETR | - | JNCSUM | ESPARM | | | | | | | | | |
| ETT | - | SOURCP | | | | | 055540 | 0.01.001 | 111661.8 | | | |
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| | | FLDDRV | ENDIF | DPI | DICOEF | | | | | | | |
| EXC | - | QFUN | PFUN | | | | | | | | | |
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| EYQ Eyrt1 | - | SOURCE | | | | | | | | | | |
| • • • • • | - | SOURCE | RPLRCL | REFCYL | RCLRPL | INCFLD | FLDDRV | ENDIF | | | | |
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| | | INCFLD | ENDIF | DPLRPL | DPLRCL | DIFPLT | | | | | | |
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| | | ENDIF | DPLRPL | DPLRCL | DIFPLT | DFPTCL | | | | | | |
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| FPA | - | DPI | | | | | | | |
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DAPDRY

PUTSYM

ESPARM

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| KJFLD | - | ZIJDRV | TSKXQT | STRTUP | SET | PRTKJ | FLDDRY | EXCDRV | BLKDAT | | |
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| KOLCOL | - | VAGLIS | TSKXQT | SYMUPD | SYMDEF | RWFILS | RESTRT | PUTSEG | GETGEO | | |
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| LSTIOD | - | BLKDAT | | | | | | | |
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| | | DPLCPL | OPLRCL | DIFPLT | DERFPT | DFPTWD | | | | | |
| MEC | - | RPLDPL | RCLOPL | GEOMPC | GEOM | DFPTWD | | | | | |
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| MEH | - | GEOM | ****** | | | | | | | | |
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| HEN | - | GEOMPC | GEOM | 061 501 | | C to co. | ccompt | 6504 | .0.00 | | |
| MEP | - | RPLDPL | RFDFPT | RCLDPL | PLAINT | GIDDRV | GEOMPC | GEOM | DPLRPL | | |
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| MEX | - | PLAINT | GTDDRV | GEOMPC | GEOM | | | | | | |
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| MFX | - | GEOM | | | | | | | |
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| ONIM | - | ZIJDRV | PUTSYM | PUTSEG | GTDDRV | GETSYM | FNDREC | FLDDRV | |
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| MKMX | - | STKDAL | | | | | | | |
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| | | GEOM | DPTNFW | DPLRPL | DPLRCL | DIFPLT | DFRFPT | DFPTWD | |
| MPH | - | PLAINT | GEOM | DIFPLT | | | | | |
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| MPP | - | RPLRPL | PLAINT | GTDDRV | GEOM | | | | |
| MPP I NX | - | GTDDRV | GEOM | | | | | | |
| MPX | - | GTDDRV | GEOMPC | GEON | | | | | |
| MPXR | - | RFPTCL | PLAINT | GTDDRV | GEOM | | | | |
| MQ | - | GEOM | | | | | | | |
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| MSAVE | - | STATOT | STATIN | | | | | | |
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| MXCYAR | - | BLKDAT | | | | | | | |
| MXDPCT | - | BLKDAT | | | | | | | |
| MXECAR | - | BLKDAT | | | | | | | |
| MXEXFP | _ | BLKDAT | | | | | | | |
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| _ | | 7610PV | TSKKAL | CAMILEO | CAMBEE | CTATOT | MITATO | SMAGNE |
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| | | STRTUP | STATOT | STATIN | STATEN | SOURCP | SOURCE | SMAGNE | SHELL |
| | | SET | SEJCON | SCTCYL | SCLRPL | RWFILS | RWCOMS | RPLSCL | RPLRPL |
| | | RPLRCL | RPLDPL | ROTRAN | ROTATE | ROMBNT | RFPTCL | RFDFPT | RFDFIN |
| | | RESTRT | REFPLA | REFCYL | REFCAP | REFBP | RDEFIL | RCLRPL | RCLDPL |
| | | RADCV | QFUN | PUTSYM | PUTSEG | PUTKWV | PRTKJ | POSTIP | POLYRT |
| | | PLAINT | PFUN | OPNFIL | NTGRAN | NFD | NANDB | MOVFIL | LUSTAT |
| | | JNCSUM | INTPLT | INCFLD | IMDIR | IMCDIR | IMAGE | IBITCK | GTDDRV |
| | | GETSYM | GETSEG | GETKWV | GETKWD | GETGEO | GETFLD | GETARG | GEOMPC |
| | | GEOMC | GEOM | FUNI | FRNELS | FNDRET | FLODRY | FKY | FKARG |
| | | FFCT | FCT | EXCDRV | ESPARM | ERROR | ENDIF | DZCOEF | DW |
| | | D 9G 32 | DPINFW | DPLRPL | DPLRCL | DPI | DMPDRV | DIFPLT | DICOEF |
| | | DFRFPT | DFPTWD | DFPTCL | CYLINT | CANXIS | CONVRT | CNVTST | CLSFIL |
| • | | CAPINT | BTANZ | BL0G10 | BÉXP | BABS | ASSIGN | | |
| RFDFIN | ~ | RPLRCL | REFCYL | RCLRPL | GEOMPC | | | | |
| RFDFPT | - | RCLDPL | DPLRCL | | | | | | |
| RFPICL | ~ | RPLRCL | REFCYL | RCLRPL | | | | | |
| RG | ~ | SCICYL | REFCYL | RCLDPL | RADCV | ENDIF | DPLRCL | | |
| RGAE | - | ENDIF | | | | | | | |
| RGF | ~ | SCTCYL | SCLRPL | RPLSCL | | | | | |
| RGI | • | SCTCYL | SCLRPL | RPLSCL | | | | | |
| RGII | • | RPLSCL | RPLRCL | | | | | | |
| RGJ | • | SCLRPL | RCLRPL | | | | | | |
| RGT | - | RADCV | _ | | | | | | |
| RHA | - | DPLRCL | | | | | | | |
| RHB | - | DPLRCL | | | | | | | |
| RHIE | - | RCLDPL | | | | | | | |
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| RWCOMS | - | WRTCHK | STRTUP | RESTRT | | | | | |
| RWFILS | - | WRTCHK | STRTUP | RESTRT | | | | | |
| RX | - | SOURCE | ROTATE | ROMBNT | DPLRPL | DIFPLT | CYAXIS | | |
| RY | - | SOURCE | ROTATE | DPLRPL | DIFPLT | DFPTWD | CYAXIS | | |
| RZ | - | SOURCE | ROTATE | DPLRPL | DIFPLT | CYAXIS | | | |
| R1K | - | SOURCE | | | | * | | | |
| RIKS | _ | SOURCE | | | | | | | |
| R2 | - | SOURCE | | | | | | | |
| RZK | _ | SOURCE | | | | | | | |
| RZKS | _ | SOURCE | | | | | | | |
| R3 | _ | SOURCE | | | | | | | |
| R S | _ | SOURCE | | | | | | | |
| S | _ | ZGTDRV | SEJCON | SCTCYL | SCLRPL | RPLSCL | RPLRCL | RFPTCL | RFDFIN |
| • | | REFCYL | RCLRPL | FRNELS | FKY | FFCT | DPLRCL | DPI | DICOEF |
| | | DEPTWD | DFPTCL | | • • • • | | V. C | V | 010001 |
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| SAS | - | SCICYL | SCLRPL | RPLSCL | RADCV | GTDDRV | FCT | | |
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| SCALES | _ | BLKDAT | | | | | | | |
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| SCTCYL | _ | GTDDRV | JUENTE | N/CJCC | | | | | |
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| SERCS | - | DEPTUD | | | | | | | |
| SET | _ | TSKXQT | | | | | | | |
| SFR | _ | FFCT | | | | | | | |
| 5 G I | - | ROMBNT | | | | | | | |
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SNPX

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RFDFPT

DFRFPT

RFPTCL

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| SORT | - | ZIJDRV | ZGTDRV | SET | SELEGU | | | | |
| | | GETGEO | FLDDRY | EXCDRV | SEJCON | PUTSEG | PRTKJ | GTDDRV | GETSEG |
| SOURCE | - | SCTCYL | SCLRPL | RPLSCL | ESPARM RPLRPL | BLKDAT | | | |
| | | REFCAP | RCLRPL | RCLDPL | INCFLD | RPLRCL | RPLDPL | REFPLA | REFCYL |
| SOURCP | - | RPLDPL | DPLRPL | DIFPLT | INCPLU | ENDIF | DPLRPL | DPLRCL | DIFPLT |
| SP | - | XYZFLO | RPLOPL | ROTATE | RCLDPL | 001.001 | | | |
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| SPS2 | - | RPLRCL | REFCYL | | | | | | |
| SPX | - | ENDIF | | | | | | | |
| SPY | - | ENDIF | | | | | | | |
| SPZ | - | ENDIF | | | | | | | |
| SP1 | • | ZGTDRV | SOURCP | SOURCE | GTDDRV | | | | |
| SPZ | - | ZGTDRV | SOURCP | SOURCE | GTDDRV | | | | |
| SQR | - | DICOEF | | | | | | | |
| SQRH | - | RPLRCL | REFCYL | RCLRPL | | | | | |
| SQRT | - | ZGTDRV | TANG | SOURCP | SOURCE | SMAGNE | SCICYL | SCLRPL | RPLSCL |
| | | RPLRPL | RPLRCL | RPLDPL | ROMBNT | RFPTCL | RFDFPT | RFDFIN | REFPLA |
| | | REFCYL | REFCAP | REFBP | RCLRPL | RCLDPL | RADCV | QFUN | PLAINT |
| | | PFUN | NIGRAN | NFD | NANDB | INCFLD | GTDDRV | GEOMC | GEOM |
| | | FUNI | FRNELS | FKY | FFCT | FCT | ESPARM | ENDIF | DPTNFW |
| | | DPLRPL | DPLRCL | DPI | DIFPLT | DICOEF | DFRFPT | DFPTWD | DFPTCL |
| SATP | _ | CYLINT | CAPINT | | | | | | |
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| SRK | _ | NIGRAN | | | | | | | |
| SRI | - | CUIDCE | | | | | | | |

COURT CLOSED SHOOME VICTORIES SANDERS CERTIFIED

STHR

STHS

RPLDPL

SOURCE

DPLRPL

SCTCYL

DIFPLT

RPLSCL

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1. C. P. A. S. S.

MAIN

SOURCE

POLYRT

TERM

TEST

FLDDRV

RPLDPL

EXCDRV

DPLRPL

DPLRCL

DIFPLT

DMPDRV

BLKDAT

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| THEN | - | RFDFPT | | | | | | | |
| THER | • | RFDFPT | DFRFPT | | | | | | |
| THEDR | - | ENDIF | ••••• | | | | | | |
| THER | _ | ENDIF | | | | | | | |
| THETA | - | ROTATE | GETFLD | EXCDRV | ESPARM | | | | |
| THEX | - | ENDIF | •••• | | | | | | |
| THEY | - | ENDIF | | | | | | | |
| THEZ | - | ENDIF | | | | | | | |
| THICR | - | RCLDPL | | | | | | | |
| THIR | • | SCICYL | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | REFPLA | REFCYL |
| | | REFBP | RCLRPL | ENDIF | DPLRPL | DPLRCL | DIFPLT | _ | |
| THJR | - | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLOPL | RCLRPL | DPLRPL | |
| THJR1 | - | SCLRPL | | | | • | | | |
| SALHT | - | SCLRPL | | | | | | | |
| THOR | - | RFDFPT | DFRFPT | | | | | | |
| THPR | - | RPLDPL | DPLRPL | DIFPLT | | | | | |
| THR | - | RPLDPL | DPLRPL | DIFPLT | | | | | |
| THSR | - | SCICYL | SCLRPL | RPLSCL | RPLRPL | RPLRCL | RPLDPL | RFDFPT | REFPLA |
| | | REFCYL | REFCAP | REFBP | RCLRPL | RCLDPL | NFD | INCFLD | GTDDRV |
| | | ENDIF | DPLRPL | DPLRCL | DIFPLT | DFRFPT | DFPTWD | | |
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| THSRZ | - | SCICAL | RPLSCL | RPLRCL | REFCYL | | | | |
| THTN | - | GTDDRY | | | | | | | |
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| THTP | - | GTDDRV | | | | | | | |
| THTPR | - | GTDDRV | | | | | | | |
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100I

TOOR

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JNCSUM

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| YC | • | GETFLD | | | | | | | |
| ACF | - | ROTRAN | GTDDRV | CYAXIS | | | | | |
| YCSRC | - | GTDDRV | | | | | | | |
| YD | - | SCTCYL | SCLRPL | RPLSCL | | | | | |
| YE | - | GEOMPC | | | | | | | |

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|------------|---|----------|--------|----------|------------|--------|--------|--------|--------|
| ZPE | - | DEPTWD | | | | | | | |
| ZPH | - | SOURCP | | | | | | | |
| ZPK | - | SOURCE | NTGRAN | | | | | | |
| ZPM | - | CYLINT | | | | | | | |
| ZPS | - | CYLINT | | | | | | | |
| ZRATI | - | ZIJDRV | ZGTDRV | STRTUP | SOURCP | SOURCE | SEJCON | PUTKWV | JNCSUM |
| | | INTPLT | GETKWV | FLDDRV | EXCDRV | BLKDAT | | | |
| ZS | - | 2 GT DRV | | | | | | | |
| ZSM | - | DFPTCL | | | | | | | |
| ZTH | - | SOURCP | | | | | | | |
| ZX | - | DFPTWD | | | | | | | |
| ZZ | - | SOURCE | | | | | | | |
| ZZXDUM | - | DMPDRV | | | | | | | |
| 223 | - | PUTSEG | | | | | | | |
| Z 1 | - | ROTATE | PUTSEG | | | | | | |
| 22 | - | PUTSEG | | | | | | | |
| 23 | - | PUTSEG | | | | | | | |

2. <u>INPUT Module</u>

| I N D E | × | | •• | SU | PER LYPEX | • • • • • • • • | | | |
|---------|---|----------|---------------|-------------|-----------|-----------------|----------|----------|---------|
| SYMBOL | - | ******** | ***** | ROUTINES IN | MHICH 186 | SAMBOF 12 | USED ==: | ******** | ***** |
| A | - | SCALES | SCALEZ | | | | | | |
| AA | - | CYLNDR | | | | _ | | | |
| ABS | - | WYRDRV | SUBPAT | SCALE3 | SCALEZ | PUTKWV | PRIGID | PLISEG | PLIORV |
| | | PAGPLT | JCTION | GEODRV | FLTPLT | | | | |
| ADDOPR | - | DMPDRV | | | | | | | |
| ADEBG | - | RWCOMS | | | | | | | |
| AINT | - | PAGPLT | _ | | | | | | |
| AL | - | SCALEZ | SCALEZ | | | | | | |
| AL0610 | - | SCALES | SCALES | PAGPLT | | | | | |
| AMAXT | - | PAGPLT | | | | | | | |
| FMIMA | - | PAGPLT | JCTION | | | | | | |
| AMOD | - | PLTDRV | | | | | | | |
| AMPZJ | - | RUCOMS | | | | | | | |
| AN | - | PLISEG | | | | | | | |
| AREA | - | SUBPAT | PATCH | | | | | | |
| AREAP | - | GECORV | | | | | | | |
| ARGCH | - | RWCOMS | | | | | | | |
| ASIN | - | GTDCS | | | | | | | |
| ASSIGN | - | ZZXDUM | WYRDRV | WRTFIL | WRICHK | TSKX2T | TRNLAT | SYSRIN | SYSCHK |
| | | SYMUPD | SYMSCH | SYMLIT | SYMDEF | SUBPAT | SCAN | SCALE3 | SCALES |
| | | RWF1LS | RUCOMS | ROTATE | RESTRT | RDEFIL | PUTSYM | PUISEG | PUTPNT |
| | | PUTKWV | PRIGIO | PRESCN | PREPAR | POSTPR | POSTIP | PLTSEG | PLTDRV |
| | | PLIST | PLATE | PATCH | PARSE | PAGPL T | OPNFIL | MOVFIL | MAIN |
| | | LNKJCT | LNKGTD | LITSCH | JCTION | INPDRV | IBITCK | GTDCS | GETSYM |
| | | GETSEG | GETPNT | GETKWV | GETKWD | GETGEO | GETARG | GEODRV | FNDREC |
| | | FNDARG | FLTPLT | FABLO2 | ENDCAP | EFDGEO | DMPDRV | CYLNDR | COORDS |
| | | CNVGTD | BUBBLE | | | | | | |
| ATANZ | - | PLTSEG | PLIDRY | GTDCS | GEODRY | | | | |
| ATTACH | _ | UYRDRV | PATCH | COORDS | | | | | |
| A11 | - | ROTATE | | | | | | | |
| A12 | - | ROTATE | | | | | | | |
| A13 | - | ROTATE | | | | | | | |
| 15A | - | ROTATE | | | | | | | |
| SSA | - | ROTATE | | | | | | | |
| ESA | _ | ROTATE | | | | | | | |
| A31 | - | ROTATE | | | | | | | |
| A32 | - | ROTATE | | | | | | | |
| A38 | _ | ROTATE | | | | | | | |
| 8 | - | SCALE3 | SCALEZ | | | | | | |
| 88 | - | CYLNDR | | | | | | | |
| BUBBLE | - | GEODRY | | | | | | | |
| (| _ | PLIDRY | DMPDRV | | | | | | |
| CHKPNT | _ | WRTFIL | BRTCHK | WLKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | 5U89 11 |
| SUBFRE | _ | STATEN | RESTRT | RDEFIL | PUTSYM | PUTKWV | PRESCN | OPNFIL | MAIN |
| | | INPDRV | GETSYM | GETKWV | GEODRY | ERROR | BUBBLE | BLKDAT | ASSIGN |
| CHKWRT | _ | WRTFIL | WRICHK | MFKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | SUBPAT |
| **** | _ | | RESTRT | RDEFIL | PUTSYM | PUIKHV | PRESCN | OPNEIL | MAIN |
| | | STATEN | GETSYM | GETKHY | GEODRY | ERROR | 8098FE | BLKDAT | ASSIGN |
| | | INPORV | 961317 | 461444 | SCOURT | FULLA | 309956 | SCRUMI | 433104 |

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| CLITE | - | PUTKWV | BLKDAT | | | | | | |
|-----------|---|--------|---------------|--------|--------|--------|----------|--------|--------|
| CLNK | - | PLATE | | | | | | | |
| CLSFIL | - | WRTCHK | SYMDEF | SUBPAT | STATFN | RWFILS | PUTSYM | OPNFIL | GEODRV |
| | | ERROR | DMPDRV | BUBBLE | | | | | |
| CMAG | - | DMPDRV | | | | | | | |
| CMPL X1 | - | DMPDRV | | | | | | | |
| CMPLX2 | - | DMPDRV | | | | | | | |
| CNSLIO | - | WRICHK | | | | | | | |
| CHVGID | - | LNKGTD | | | | | | | |
| COMPLT | - | WRTFIL | WRTCHK | AFKBCK | TSKXQT | TRCE3K | SYSCHK | SYMDEF | TAGBUZ |
| | | STATEN | RESTRT | ROEFIL | PUTSYM | PUTKWV | PRESCN | OPNFIL | MAIN |
| | | INPORV | GETSYM | GETKWV | GEODRY | ERROR | 8UB 8L E | BLKDAT | ASSIGN |
| COMSAV | - | SYSCHK | | | | | | | |
| CONVRT | - | TSKXQT | SYMUPD | SYMDEF | RWFILS | RESTRT | PUTSYM | PUTKWV | PREPAR |
| | | POSTPR | POSTIP | PLIDRY | MAIN | GETSYM | GETKWV | GETARG | GEODRY |
| | | FNDREC | DMPDRV | | | | | | |
| COORDS | - | WYRDRY | PATCH | | | | | | |
| COPI | - | DMPDRV | | | | | | | |
| COP2 | - | DMPDRV | | | | | | | |
| cos | - | ROTATE | PATCH | | | | | | |
| COSALP | - | GEODRY | | | | | | | |
| COSBET | - | GEODRY | | | | | | | |
| CP | - | ROTATE | PLTSEG | PATCH | | | | | |
| CPFRWD | - | WRTFIL | WRICHK | WLKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | SUBPAT |
| | | STATFN | RESTRT | RDEFIL | PUTSYM | PUTKHY | PRESCN | OPNFIL | MAIN |
| | | [NPORV | GETSYM | GETKWV | GEODRY | ERROR | BUBBLE | BLKDAT | ASSIGN |
| C S | - | ROTATE | | | | | | | |
| CSIM | - | RWCOMS | | | | | | | |
| CT | - | ROTATE | PATCH | | | | | | |
| CVAL | - | WYRDRY | GTDCS | GEODRY | COORDS | BLKDAT | | | |
| CX | - | WYRDRY | GIDCS | GEODRV | COORDS | BLKDAT | • | | |
| CY | - | GTDCS | COORDS | | | | | | |
| CYLNDR | - | WYRDRV | | | | | | | |
| CZ | - | GTDCS | COORDS | | | | | | |
| D | - | PRIGTO | PLATE | LNKGID | | | | | |
| MITAG | - | SYSRTN | | | | | | | |
| DOGPRI | - | ZZXDUM | WYRDRV | WRTFIL | WRTCHK | WLK8CK | TSKXQT | TRNLAT | TRCEBK |
| | | SYSRIN | SYSCHK | SYMUPO | SYMSCH | SYMLIT | SYMDEF | SUBPAT | STATOT |
| | | STATIN | STATFN | SHELL | SCAN | SCALES | SCALES | RWFILS | RWCOMS |
| | | ROTATE | RESTRT | RDEFIL | PUTSYM | PUTSEG | PUTPNT | PUTKWV | PRIGIO |
| | | PRESCN | PREPAR | POSTPR | POSTIP | PLTSEG | PLTDRV | PLIST | PLATE |
| | | PATCH | PARSE | PAGPLT | OPNFIL | MOVFIL | MAIN | LNKJCT | LNKGTO |
| | | LITSCH | JCTION | INPDRV | IBITCK | GTDCS | GETSYM | GEISEG | GETPNI |
| | | GETKWV | GETKWD | GEIGEO | GETARG | GEODRV | FNDREC | FNDARG | FLTPLT |
| | | FABLO2 | ERROR | ENDCAP | EFDGEO | DMPDRV | CYLNDR | COORDS | CONVRI |
| | | CNVGTO | CLSFIL | 8188FE | BLKDAT | ASSIGN | | | |
| DB1 | - | PLTSEG | | | | | | | |
| DBT | - | PLISEG | | | | | | | |
| DC4R | - | PAGPLT | | | | | | | |
| 0 C T M W | _ | DAGDIT | | | | | | | |

| IN DEX | | | | | | | | | | |
|--------|---|----------------|------------------|-------------|---|--------|--------|--------|---|--|
| DEL | • | SCALE3 | SCALEZ | | | | | | | |
| DFDT | - | RWCOMS | •••• | | | | | | | |
| DETORD | - | WYRDRY | PRIGID | PLIDRY | PATCH | GEODRV | ENDCAP | BLKDAT | | |
| 1210 | _ | SCALES | SCALEZ | | | | | | | |
| DISTL | _ | SCALE3 | | | | | | | | |
| DIVOPR | - | DMPDRV | | | | | | | | |
| Lo | - | SYSRTN | | | | | | | | |
| DLINV | - | PAGPLT | | | | | | | | |
| DLYN | _ | PAGPLT | | | | | | | | |
| DMPDRV | - | TSKXQT | | | | | | | | |
| 901 | - | FLTPLT | | | | | | | | |
| DT | _ | WRICHK | ISKXQT | TICHEK | SYSCHK | | | | | |
| ο× | - | WYRDRY | TRNLAT | PAGPLT | JCTION | GEODRY | COORDS | CNVGID | | |
| 0 Y | - | WYRDRY | TRNLAT | PAGPLT | TCLION | GEODRY | COORDS | CNVGTD | | |
| οZ | - | WYRORV | TRNLAT | JCTLON | GEODRY | COORDS | CUACID | | | |
| EFDGEO | - | ISKXQI | | | | | | | | |
| EN | - | PLISEG | | | | | | | | |
| ENDCAP | - | WYRDRY | | | | | | | | |
| ENM | - | PLISEG | | | | | | | | |
| ENX | - | PLTSEG | | | | | | | | |
| ENY | - | PLTSEG | | | | | | | | |
| ENZ | - | PLISEG | | | | | | | | |
| EPSA | - | PUTKWV | GEIKAA | BLKDAT | | | | | | |
| ERRFLG | - | PLATE | LNKGTO | ENDCAP | CYLNDR | | | | | |
| ERRMS6 | - | HYRDRY | FABLOZ | | | | RESTRI | RDEFIL | PUISYM | |
| ERROR | - | WRTFIL | TSKXQT | SYSCHK | SYMUPD | SYMBEF | MOVFIL | GETSYM | GETKWY | |
| | | PUTPNT | PUTKWV | PRESCN | PLIDRY | OPNFIL | HOTTLE | 96101 | 42 • • • • • • • • • • • • • • • • • • • | |
| | | GETARG | FNDREC | DMPDRV | COORDS | CNVGTD | | | | |
| ET | - | SYSCHK | | | | | | | | |
| AIB | - | BLKDAT | | | | | | | | |
| ETIME | - | SYSCHK | | | | | | | | |
| EXPOPR | - | DMPDRV | | | | | | | | |
| £1x | - | PLISEG | FLTPLT | | | | | | | |
| ETY | - | PLTSEG | FLTPLT | | | | | | | |
| E1Z | - | PLISEG | FLTPLT FLTPLT | | | | | | | |
| E2X | - | PLISEG | FLIPLT | | | | | | | |
| ESA | - | PLISEG | FLTPLT | | | | | | | |
| 223 | - | PLISEG | SYMLIT | PLIST | PARSE | LITSCH | FNDARG | | | |
| FABLOS | - | SYMSCH | 1811CK | 76131 | * ************************************* | | | | | |
| FIRST | - | SCAN Putkwy | GEIKHA | BLKDAT | | | | | | |
| FJ | - | WYRDRY | 46,,,,, | JUNU | | | | | | |
| FJS | - | RUCOMS | | | | | | | | |
| FLOCK | _ | LNKGTD | CYLNDR | CNVGTD | | | | | | |
| FLEN | - | WYRORY | SYSRIN | SYSCHK | SCAN | SCAL#3 | SCALES | PLIDRY | PATCH | |
| FLOAT | - | PAGPLT | LITSCH | GETKHY | GETARG | ENDCAP | DMPORV | CYLNDR | | |
| FLTARG | - | MUCKSS | WYRDRY | TSKXQT | SYMDEF | RESTRT | PLTDRV | OPNFIL | MAIN | |
| | | GETGEO | GETARG | GEODRY | EFDGEO | DMPDRV | BLKDAT | | | |
| FLTINC | - | SYSCHK | | | | | | | | |
| FLTLIT | | ZZXDUM | WYRDRY | WRTCHK | TSKXQT | SYMUPD | STMSCH | SYMLIT | SYMDEF | |

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| | | PREPAR | POSTPR | POSTIP | PLTDRV | PLIST | PATCH | PARSE | OPNFIL |
| | | MAIN | LITSCH | INPORV | GETSYM | GETKWV | GETKWD | GETGEO | GETARG |
| | | GEODRY | FNDREC | FNDARG | EFDGEO | DMPDRV | CONVRI | BLKDAT | 0211110 |
| FLTPLT | - | PLATE | | | | • • | ••••• | | |
| FLTSYM | - | SYMDEF | PUTSYM | GETSYM | BLKDAT | | | | |
| FMT | - | SCALES | SCALEZ | | | | | | |
| FM2 | • | SCALE3 | SCALEZ | | | | | | |
| FN | _ | SCALES | SCALEZ | | | | | | |
| FNDARG | - | PARSE | | | | | | | |
| FNDREC | - | PUTSYM | GETSYM | | | | | | |
| FRAC | - | SCAN | | | | | | | |
| FROMHZ | - | PUTKWV | GETKWV | | | | | | |
| FSTCHK | - | WRTCHK | | | | | | | |
| FO | - | ENDCAP | CYLNDR | | | | | | |
| FI | - | PRIGIO | LNKGTD | ENDCAP | CYLNDR | | | | |
| F12 | - | ENDCAP | CYLNDR | | | | | | |
| F2 | - | PRIGID | LNKGTD | | | | | | |
| F3 | - | PRIGID | LNKGTD | | | | | | |
| F 34 | - | ENDCAP | CYLNDR | | | | | | |
| F4 | - | LNKGTD | | | | | | | |
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| f 56 | - | ENDCAP | CYLNDR | | | | | | |
| F6 | - | LNKGTD | | | | | | | |
| GAREA | _ | GEODRY | | | | | | | |
| GEODRY | - | TSKXQT | | | | | | | |
| GEODT | - | RUCOMS | | | | | | | |
| GETARG | - | GETGEO | GEODRY | | | | | | |
| GETGEO | - | PLIDRY | | | | | | | |
| GETKWD | - | SCAN | | | | | | | |
| GETKUV | - | DMPDRV | | | | | | | |
| GETPNT | • | WYRDRY | PRIGIO | PLATE | PATCH | LNKGID | | | |
| GETSEG | - | WYRDRY | SUBPAT | PUTSEG | PRIGIO | PLTSEG | PLTDRV | LNKJCT | LNKGTD |
| | | JCTION | GETGEO | GEODRY | CNVGTD | BUBBLE | | | |
| GETSYM | ~ | WRICHK | SYMDEF | SUBPAT | RESTRT | PUTSYM | PUTSEG | PLIDRY | GETSEG |
| | | GETARG | GEODRY | DMPDRV | | | | | |
| 6TDC5 | - | LNKGTD | CYLNDR | | | | | | |
| GIDOT | ~ | RWCOMS | | | | | | | |
| HI | - | SHELL | | | | | | | |
| ı | - | ZZXDUM | WYRDRV | SYSRIN | SYMSCH | SUBPAT | STATFN | SHELL | SCALE3 |
| | | SCALES | RWF ILS | RWCOMS | RESTRI | PUTSYM | PUT SEG | PUTPNI | PRESCN |
| | | PREPAR | POSTPR | POSTIP | PLTSEG | PLTDRV | PAGPLT | MAIN | LNKJCT |
| | | LITSCH | JCTION | INPDRV | IBITCK | GTDCS | GETSYM | GETPNT | GETKWD |
| | | GETGEO | GEODRV | FNDREC | FABLOZ | ERROR | COORDS | CONVRT | CWVGTD |
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| IABS | - | WYRDRY | TSKXQT | PRESCN | POSTLP | PLTDRV | PAGPLT | OPNFIL | LNKGID |
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COORDS

BLKDAT

MAIN

WYRDRY

GIDCS

GEODRY

IDCSYS

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| IDEF | _ | WYRDRY | | | | | | | |
| IDEFIN | _ | WYRDRY | GEODRY | BLKDAT | | | | | |
| IDFINS | - | WYRDRY | GEODRY | BLKDAT | | | | | |
| 9101 | _ | SCAN | BLKDAT | 00.107. | | | | | |
| IDOLAR | - | BLKDAT | | | | | | | |
| IEC | - | LNKGTD | | | | | | | |
| IECPT | - | PRIGID | LNKGTD | | | | | | |
| LECPTI | _ | LNKGTD | • | | | | | | |
| IECP12 | - | LNKGTD | | | | | | | |
| 1ECTAG | - | PRIGID | LNKGTD | ENDCAP | BLKDAT | | | | |
| IECO | - | LNKGTD | • | • | | | | | |
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| I END 1 | - | GEODRY | CNVGTD | | | | | | |
| IENDS | • | GEODRY | CNVGID | | | | | | |
| IEOF | ~ | WRTCHK | RWCOMS | RESTRT | | | | | |
| IEGUAL | - | DMPDRV | BLKDAT | | | | | | |
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| <i>IERRF</i> | - | WRTFIL | TSKXQT | SYSCHK | SYMUPD | SYMDEF | RWFILS | RESTRT | RDEFIL |
| | | PUTSYM | PUIPNT | PUTKWV | PRESCN | OPNFIL | MOVFIL | GETSYM | GETKWV |
| | | FNDREC | ERROR | DMPDRV | COORDS | CNVGID | BLKDAT | | |
| IFILE | • | SYMUPD | SUBPAT | RWFILS | PUTSYM | MOVFIL | GETSYM | FNDREC | CLSFIL |
| IFTRST | • | LNKJCT | | | | | | | |
| IFIX | - | SYSRIN | STATFN | PAGPLT | ENDCAP | CYLNDR | | | |
| IFLE | • | MOVFIL | | | | | | | |
| 1 FLG | ~ | LITSCH | | | | | | | |
| IFLNAM | • | RWCOMS | | | | | | | |
| LFOUND | • | WYRDRV | SCAN | | | | | | |
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| IGBLKI | • | PRIGIO | PLISEG | | | | | | |
| IGEOBT | - | EFDGEO | | | | | | | |
| IGLIM | - | PRIGIO | PLTSEG | LNKGTD | | | | | |
| IGLIMI | - | PRIGIO | PLTSEG | | | | | | |
| IGLON | - | PRIGIO | PLTSEG | LNKGTD | | | | | |
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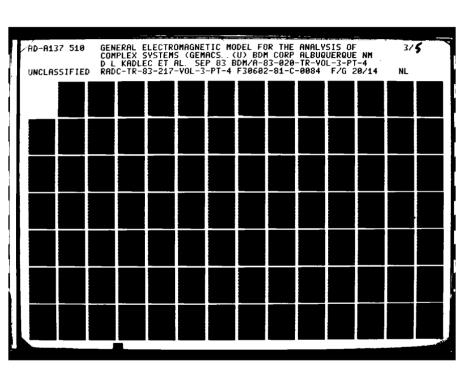
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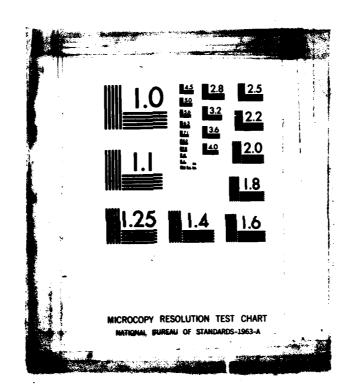
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| NIAbE | - | PRIGID | | | | | | | |
| NU | - | PATCH | | | | | | | |
| NUMARG | - | ZZXDUM | TSKXQT | PLIDRY | EFDGEO | DMPDRV | BLKDAT | | |
| NUMBLK | - | WYRDRV | PUTSEG | GETSEG | | | | | |
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| NUMEC | - | ENDCAP | | | | | | | |
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| VR | - | SPUDRV | SOLVIC | | | | | | | | |
| VTHETA | - | EXCDRV | 306116 | | | | | | | | |
| WAVLEH | - | ZIJDRV | INEFLD | PUTKWV | LODDRY | EXCDRV | | | | | |
| HAVNUM | - | TERLIS | ZIJDRV | UNHFLD | UNEFLD | INHFLD | TNEFLD | 60U88U | 644 7 W | | |
| W. C. | | NIRPLI | NERFLD | LODDRY | FARFLD | EXCDRV | CABC | SPUDRV | PUTKWV | | |
| WIRE | - | SPUDRY | WC 11 C D | COODE | FARTED | CALURY | CABC | | | | |
| WLKBCK | _ | ZZXDUM | ZIJSET | ZIJDRV | ZCDRVR | WYRPAT | WRTFIL | 48764× | | | |
| WCND | | UNEFLD | TSKXQT | TNHFLD | THEFLD | SYSRIM | SYSCHK | WRTCHK Symupo | UNHFLD | | |
| | | SYMDEF | STRTUP | SPUDRY | SOLVOC | SOLVIC | SOLDRY | _ | SYMMOD | | |
| | | SET | SEJCON | SCALE3 | SCALES | RWFILS | RUCOMS | SMATRX | SETORV | | |
| | | RDEFIL | PUTSYM | PUTSEG | PUIKWV | PRISYM | PRIKJ | ROMBNT | REBLCK | | |
| | | NTRPLU | NTRPLT | NERFLD | MOVFIL | LUDDRY | LODSYM | PAGPLT | OPNFIL | | |
| | | IBITCK | GNOREF | GETSYM | GETSEG | GETKWY | GETKWO | LODDRY | JNCSUM | | |
| | | FNDREC | FLDDRV | FARFLD | FABLO4 | EXCDRV | ERROR | GETGEO EFGMAT | GETARG | | |
| | | DECOMP | CONTRE | CNVAMP | CABC | BMIRHS | BANDIT | BACSUB | DMPDRV | | |
| WORDS | - | ZZXDUM | ZIJSET | ZIJDRV | ZCDRVR | WYRPAT | WRTFIL | | | | |
| | | UNHFLD | UNEFLD | TSKXQT | TRCEBK | TNHFLD | TNEFLD | WRICHK | WLKBCK | | |
| | | SYMUPD | SYMMOD | SYMDEF | STRTUP | STATOT | STATIN | SYSRIN | SYSCHK | | |
| | | SOLVOC | SOLVIC | SOLDRY | SMATRX | SHELL | SETORY | STATFN SET | SPWDRV | | |
| | | SCALES | SCALEZ | RWFILS | RWCOMS | ROMBNI | REBLCK | | SEJCON | | |
| | | PUTSEG | PUTKWV | PRTSYM | PRIKJ | PAGPLT | OPNFIL | RDEFIL | PUISYM | | |
| | | NTGRAN | NERFLD | | | | | NTRPLU | NTRPLT | | |
| | | IBITCK | GNOREF | MOVFIL | MAIN | LUDDRV | LODSYM | LODDRV | JNCSUM | | |
| | | FNDREC | | | GETSEG | GETKWV | GETKWD | GETGEO | GETARG | | |
| | | DECOMP | FLODRY | FARFLB | FABLO4 | EXCDRV | ERROR | EFGMAT | DMPDRV | | |
| | | BANDIT | CONVRT BACSUB | DULMOS | CNVAMP | CLSFIL | CABC | BMIRHS | BLKDAT | | |
| | | 244611 | 946208 | ASSIGN | | | | | | | |

| INDE | X | | | | | | | | |
|---------|---|----------------|----------|----------|-----------|-----------------|---------|-------------|--------|
| | | | *** | ***** SU | PER INDEX | •••••• | • | | |
| WRITE | - | ZZXDUM | ZIJSET | ZIJDRV | WRIFIL | WRTCHK | WLKBCK | ISKXQI | TRCEBK |
| wn | - | SYSCHK | SYMUPD | SYMDEF | STRTUP | STATOT | STATIN | STATEN | SOLDRY |
| | | SMATRX | SETDRY | SEJCON | SCALES | SCALEZ | RUFILS | RUCOMS | REBLCK |
| | | RDEFIL | PUTSYM | PUTSEG | PUTKEV | PRISYM | PRIKJ | PACPLY | OPNFIL |
| | | NERFLD | MOVFIL | MIAH | LUDDRY | LODDRY | GETSYM | GETSEG | GETKWV |
| | | GETGEO | GETARG | FNDREC | FLDDRV | FARFLD | FABL D4 | EXCORV | EFGMAT |
| | | DMPDRV | DECOMP | CNVAMP | CABC | | | ASSIGN | Cronni |
| WRICHK | _ | ISKXQI | SYSCHK | STATEN | SOLDRY | BANDIT Error | BACSUB | W 2 2 1 0 W | |
| WRIFIL | _ | WRICHK | SOLDRY | RWFILS | RUCOMS | PUTSYM | PRISYM | DECOMP | |
| WRITSK | - | PRISYM | SOCORV | 48.172 | WACONS | FUISIN | raisin | DECOMP | |
| WYRPAT | _ | | | | | | | | |
| X | _ | NIRPLU Zint | PAGPLT | FLDDRV | | | | | |
| хc | _ | SPUDRV | PAGPLI | FLOOR | | | | | |
| XD | _ | - | | | | | | | |
| | | NERFLD | | | | | | | |
| XI. | - | ZIJSET | WYRPAT | SEJCON | | | | | |
| X[J | - | TIJSET | WYRPAT | UNHFLD | UNEFLD | NTRPLU | | | |
| XJ | - | TERLIS | WYRPAT | NOOLBS | | | | | |
| XJSAVE | | WYRPAT | 464163 | | | | | | |
| XMAX | - | SCALES | SCALEZ | PAGPLT | | | | | |
| JKANK | - | SCALE3 | | | | | | | |
| XMAXP | - | SCALES | SCALES | PAGPLT | | | | | |
| XMIN | - | SCALES | SCALES | PAGPLT | | | | | |
| XMINE | - | SCALE3 | | | | | | | |
| XM I NP | _ | SCALE3 | SCALEZ | PAGPLT | | | | | |
| XOS | - | NERFLD | | | | | | | |
| XP | - | PAGPLT | | | | | | | |
| XR | - | SPUDRY | | | | | | | |
| XS | - | SPUDRY | | | | | | | |
| XSS | • | UYRPAT | | | | | | | |
| XVAL | - | PAGPLT | 21 22 2W | | | | | | |
| XA | - | SPWDRV | FLDDRV | | | | | | |
| XWORDS | - | WRIFEL | RDEFIL | | | | | | |
| XXI | - | PUTSEG | | | | | | | |
| XYRAG | - | TERLIS | HERFLD | | | | | | |
| X1 | - | PUTSEG | | | | | | | |
| x2 | - | PUISEG | | | | | | | |
| x3 | - | PUTSEG | | 54.00014 | | | | | |
| ¥ | - | ZINT | PAGPLT | FLDDRV | | | | | |
| YC | - | SPUDRV | | | | | | | |
| 70 | - | NERFLD | | | | | | | |
| AI | - | ZIJSET | WYRPAT | NOSLES | 11465. 5 | M 2 8 5 1 11 | | | |
| YIJ | - | TBELIS | WYRPAT | UNHFLD | UNEFLD | NTRPLU | | | |
| YJ | - | ZIJSET | WYRPAT | SEJCON | | | | | |
| BVASLY | - | WYRPAT | | | | | | | |
| XMAX | - | PAGPLT | | | | | | | |
| YMAXP | - | PAGPLT | | | | | | | |
| YMIN | - | PAGPLT | | | | | | | |

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Pron

SPUDRY

| IND | EX | | ***** | SUPER | INDEX | ••••• |
|-----|----|--------|--------|-------|-------|-------|
| ZSS | - | WYRPAT | | | | |
| ZW | • | SPWDRV | FLDDRV | | | |
| | | | | | | |

2W - SPWORV
2Z - INEFLD
2ZXDUM - ZCDRVR
2Z3 - PUTSEG
21 - PUTSEG
22 - PUTSEG
23 - PUTSEG

4. <u>OUTPUT Module</u>

| I N D E | x | | ** | SU | PER INDEX | | | | |
|---------|---|-----------|---------|-------------|-----------|-----------|----------|--------|----------------|
| SYMBOL | - | ********* | ****** | ROUTINES IN | MHICH THE | SYMBOL IS | USED === | | **** |
| A | - | SCALES | SCALEZ | | | | | | |
| ABS | - | SCALE3 | SCALEZ | PUTKWV | PAGPLT | GETGEO | FLDOUT | FLDDRV | |
| ADDOPR | - | DMPORV | | | | | | | |
| ADEBG | - | RWCOMS | | | | | | | |
| AINT | - | PAGPLT | | | | | | | |
| AL | - | SCALE3 | SCALEZ | | | | | | |
| AL0610 | - | SCALES | SCALEZ | PAGPLT | FLDOUT | | | | |
| AMAX1 | - | PAGPLT | FLDOUT | FLDDRV | | | | | |
| AMIN1 | - | PAGPLT | FLDOUT | | | | | | |
| AMPZJ | - | RWCOMS | | | | | | | |
| ANG | - | FLDOUT | | | | | | | |
| ARG | - | FLDOUT | | | | | | | |
| ARGEM | - | RWCOMS | | | | | | | |
| ASSIGN | - | WRTFIL | WRICHK | TSKXQT | SYSRIN | SYSCHK | SYMUPD | SYMDEF | STRTUP |
| | | SET | SCALES | SCALES | ruf ILS | RWCOMS | RDEFIL | PUTSYM | PUTKWV |
| | | PAGPLT | OPNFIL | MOVFIL | MAIN | IBITCK | GETSYM | GETKWV | GETKWD |
| | | GETGEO | GETARG | FNDREC | FLDOUT | FLDDRV | OMPORV | | |
| SWATA | - | FLDDRV | | | | | | | |
| 8 | - | SCALES | SCALEZ | | | | | | |
| Č | - | DMPDRV | | | | | | | |
| CHKPNT | - | WRTFIL | WRTCHK | AFKBCK | TSKXQT | TRCEBK | SYSCHK | SYMDEF | STRTUP |
| | | STATFN | RUF ILS | RDEFIL | PUTSYM | PUIKWY | OPNFIL | MAIN | GETSYM |
| | | GETKWY | ERROR | BLKDAT | ASSIGN | | | | |
| CHKWRT | - | WRTFIL | WRTCHK | MFKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | STRTUP |
| • | | STATEN | RWFILS | RDEFIL | PUTSYA | PUTKWV | OPNFIL | MAIN | GETSYM |
| | | GETKWV | ERROR | BLKDAT | ASSIGN | | | | |
| CI | - | FLDDRV | | | | | | | |
| CIMC | _ | FLDOUT | | | | | • | | |
| CLITE | - | | BLKDAT | | | | | | |
| CLSFIL | - | | SYMDEF | STATFN | RWFILS | PUTSYM | OPNFIL | ERROR | DMPDRV |
| CMAG | - | DMPDRV | | | | | | | |
| CHPL X1 | - | DMPDRV | | | | | | | |
| CMPL X2 | - | | | | | | | | |
| CNSLIO | - | | | | | | | | |
| COMPLT | _ | | WRTCHK | WLKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | STRTUP |
| | | STATEN | RUFILS | RDEFIL | PUTSYM | PUTKWV | OPNFIL | MAIN | GETSYM |
| | | GETKHY | ERROR | BLKDAT | ASSIGN | | | | |
| COMSAV | - | | - | | | | _ | | A B 644 1 - 14 |
| CONVRT | _ | | SYMUPD | SYMDEF | RWFILS | PUTSYM | PUTKUV | GETSYM | GETKWV |
| | | GETGEO | GETARG | FNDREC | FLDOUT | FLODRY | DMPDRV | | |
| COPT | - | | | | | | | | |
| COPZ | | | | | | | | | |
| COS | - | | | | | | | | |
| CPFRWD | | | WRTCHK | MFKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | STRTUP |
| | | STATEN | RWFILS | RDEFIL | PUTSYM | PUTKYV | OPNFIL | MAIN | GETSYM |
| | | GETKHY | ERROR | BLKDAT | ASS IGN | | | | |
| | _ | FLODRY | | | | | | | |



| 1 N D E | x | | | | | | | | |
|-------------|---|------------------|------------------|-----------|-----------|-------------------|--------|--------|-----------|
| | | | *** | •••••• St | JER INDEX | ******* | | | |
| CV | - | FLDOUT | | | | | | | |
| CVAL | - | BLKDAT | | | | | | | |
| CX | - | BLKDAT | | | | | | | |
| DATIM | - | SYSRTN | | | | | | | |
| DBGPRT | - | WRIFIL | WRTCHK | WLK9CK | TSKXQT | TRCE3K | SYSRIN | SYSCHK | SYMUPD |
| | | SYMDEF | STRTUP | STATOT | STATIN | STATEN | SHELL | SET | SCALES |
| | | SCALES | RWFILS | RWCCAS | RDEFIL | PUTSYM | PUIKHV | PAGPLT | OPNFIL |
| | | MOVFIL | MAIN | 181.ck | GETSYM | GETKWV | GETKWD | GETGEO | GETARG |
| | | FNDREC | FLDOUT | FLDDRY | ERROR | OMPORY | CONVRT | CLSFIL | BLKDAT |
| | | ASSIGN | | | | | | | |
| DBMIN | - | FLDOUT | | | | | | | |
| DCHR | - | PAGPLT | | | | | | | |
| DCINV | - | PAGPLT | | | | | | | |
| DEL DFDT | - | SCALES | SCALEZ | | | | | | |
| DETORD | _ | RWCOMS Flout | EL BBOY | | | | | | |
| DIST | _ | SCALES | FLDDRV Scale2 | BLKDAT | | | | | |
| DISTL | - | SCALES | 204665 | | | | | | |
| DIVOPR | • | DMPDRV | | | | | | | |
| DJ | - | SYSRTN | | | | | | | |
| DLINV | - | PAGPLT | | | | | | | |
| DLYN | - | PAGPLT | | | | | | | |
| DMPDRV | - | TSKXQT | | | | | | | |
| DT | - | WRTCHK | TSKXQT | TICHEK | SYSCHK | | | | |
| DX | - | PAGPLT | | | | | | | |
| DY | - | PAGPLT | | | | | | | |
| DYNAMR | - | FLDOUT | | | | | | | |
| EMAXSQ | • | FLDOUT | | | | | | | |
| EPH EPSR | - | FLOORY | <i></i> | | | | | | |
| ERROR | | PUTKUV WRTFIL | GETKWV TSKXQT | BLKDAT | | | | | |
| | | OPNFIL | MOVFIL | SYSCHK | SYMUPD | SYMDEF | RDEFIL | PUTSYM | PUTKWV |
| | | DMPDRV | HOALTE | GETSYM | GETKWV | GETARG | FNDREC | FLBOUT | FLDDRV |
| ESOR | - | FLDDRV | | | | | | | |
| ET | - | SYSCHK | | | | | | | |
| ETA | - | BLKDAT | | | | | | | |
| ETH | • | FLDDRV | | | | | | | |
| ETIME | - | SYSCHK | | | | | | | |
| EX | - | FLDDRY | | | | | | | |
| EXPOPR | - | DMPDRV | | | | | | | |
| EY | - | FLDDRY | | | | | | | |
| EZ | - | FLDDRV | | | | | | | |
| FAR | - | FLDOUT | | | | | | | |
| FIRST FJ | - | IBITCK | PUTKWY | CETYLLE | 51 DOOM | 04 × 5 4 5 | | | |
| FLOCH | - | STRTUP RWCOMS | LOIKAA | GETKUV | FLDDRV | BLKDAT | | | |
| FLOORY | • | TSKXQT | | | | | | | |
| FLOOUT | - | FLDDRV | | | | | | | |
| FLOAT | - | SYSRIN | SYSCHK | SCALE 3 | SCALES | PAGPLT | GETKWV | GETARG | DMPDRV |
| FLTARE | - | TSKXOT | SYMOEF | SET | RWFILS | OPNFIL | MIAM | GETGEO | GETARG |
| - | | | | | | J 1 6 | | | UC . ~ RU |

I N D E X

| | | FLODRY | DMPORV | BLKDAT | | | | | |
|---------------|---|--------|---------|----------|--------|--------|--------|--------|--------|
| FLTINC | - | SYSCHK | | | | | | | |
| FLTLIT | - | WRTCHK | TSKXQT | SYMUPO | SYMOEF | STRTUP | RWFILS | PUISYM | PUTKUV |
| | | OPNFIL | MAIN | GETSYM | GETKWV | GETKWD | GETGEO | GETARG | FNDREC |
| | | FLDOUT | FLDDRV | DMPDRV | CONVRT | BLKDAT | | | |
| FLTSYM | - | SYMDEF | PUTSYM | GETSYM | BLKDAT | | | | |
| FM1 | - | SCALE3 | SCALES | | | | | | |
| FM2 | - | SCALES | SCALES | | | | | | |
| FN | • | SCALE3 | SCALES | | | | | | |
| FNDREC | - | PUTSYM | GETSYM | | | | | | |
| FRFLD | - | FLODRY | | | | | | | |
| FROMHZ | - | STRTUP | PUTKWV | GETKWV | | | | | |
| FSTCHK | - | WRTCHK | | | | | | | |
| GEODT | - | RWCOMS | | | | | | | |
| GETARG | - | TSKXQT | GETGEO | FLDDRV | | | | | |
| GETGEO | - | TSKXQT | | | | | | | |
| GETKUV | - | DMPDRV | | | | | | | |
| GETSEG | - | GETGEO | | | | | | | |
| GETSYM | - | WRTCHK | SYMDEF | STRTUP | PUTSYM | GETARG | FLDOUT | FLDDRY | DMPDRV |
| GTDDT | - | RWCOMS | | | | | | | |
| HEAD | - | FLDOUT | | | | | | | |
| M I | - | SHELL | | | | | | | |
| I | - | SYSRIM | STRTUP | STATFN | SHELL | SET | SCALE3 | SCALES | RWFILS |
| | | RWCOMS | PUTSYM | PAGPLT | IBIACK | GETSYM | GETKWD | GETGEO | FNDREC |
| | | FLBOUT | FLODRV | ERROR | CONVRI | BLKDAT | | | |
| 1 AB S | - | TSKXQT | PAGPLT | OPNF I L | GETARG | DMPDRV | | | |
| EAXES | - | BLKDAT | | | | | | | |
| IBAND | - | PUTSYM | GETSYM | FNDREC | | | | | |
| 1911 | - | IBITCK | | | | | | | |
| IDITA | - | FLDDRY | | | | | | | |
| 1811CK | - | Symbef | rwf ILS | PUTSYM | GETSYM | FNOREC | FLDOUT | DMPDRV | |
| 10178 | - | DMPDRV | | | | | | | |
| 10173 | - | TSKXQT | SYMDEF | | | | | | |
| 10171 | - | SYMDEF | DMPDRV | | | | | | |
| 19112 | - | DAPDRY | | | | | | | |
| IBLANK | - | FLDDRY | BLKDAT | | | | | | |
| IBLK | - | 661660 | FLDDRV | | | | | | |
| IBLKK | - | GETGEO | | | | | | | |
| IBLKL | - | AFKBCK | | | | | | | |
| 10 | - | SYSRIN | FLDDRV | | | | | | |
| 1 CHAR | - | CONVRT | | | | | | | |
| 1 CHK PT | - | STRTUP | | | | | | | |
| ICKFIL | • | WRTCHK | | | | | | | |
| ICKTOP | - | STRTUP | | | | | | | |
| ICOLA | • | FLDDRY | | | | | | | |
| I COLMN | - | FLDDRV | | | | | | | |
| ICOL1 | - | FLDDRY | | | | | | | |
| 1 COM | • | RWCOMS | | | | | | | |
| ICOMMA | • | BLKDAT | | | | | | | |
| | | | | | | | | | |

10.

FRITTENIN CHANGE 1950

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IDCSYS
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IDOLAR
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               FLDOUT
 IECTAG
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                          STRTUP
                                     RWCOMS
I EQUAL
               DMPDRV
                          BLKDAT
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               WRTFIL
                          TSKXQT
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                                                SYMUPD
                                                           SYMDEF
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                                                                                            RDEFIL
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               FLDDRY
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                                     DMPDRV
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                          RWFILS
                                     PUTSYM
                                                MOVFIL
                                                           GETSYM
                                                                      FNDREC
                                                                                 CLSFIL
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               SYSRIN
                          STATEN
                                     PAGPLT
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                                     FLDDRY
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                          GETSYM
                                     FNDREC
ILEFT
               DMPORV
                          BLKDAT
ILOWER
               PUTSYM
                          GETSYM
                                     FNOREC
ILP
               DMPDRY
ILIM
               GETGEO
IM
               SHELL
                          STRTUP
IMDCHK
               WRTCHK
                                     STATEN
                                                PUTSYM
                                                          BLKDAT
IMINUS
               DMPDRY
                          BLKDAT
IHIS
               FLDDRY
IMI
               PAGPLT
                          IBITCK
INAME
               BLKDAT
INCCHK
               TSKXQT
                          SYSCHK
               FLOORY
INCORE
IND
               CONVRT
INDEX
               GETKWD
                         GETGEO
                                     FLDDRV
               FLDDRY
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INDXA
               FLDDRV
               FLDDRY
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| INDE | × | | | | | | | | |
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| | | | •• | •••••• S | UPER INDEX | ******* | • | | |
| INDXG | _ | TSKXQT | | | | | | | |
| INDXPT | - | RWCOMS | | | | | | | |
| SWX CHI | _ | MFKBCK | TRCEBK | BUCAME | | | | | |
| INEW | _ | SYMDEF | INCEDA | RUCOMS | BLKGAT | | | | |
| INR | _ | FLDOUT | | | | | | | |
| INT | - | PUTKWV | GETARG | | | | | | |
| INTARG | _ | TSKXQT | SYMDEF | SET | 811534.0 | | | | |
| | | FLDDRY | DMPDRV | BLKDAT | RWFILS | OPNFIL | MAIN | GETGEO | GETARG |
| INTBCD | - | CONVRT | | GCZOZI | | | | | |
| INTM | - | RWCOMS | | | | | | | |
| INTSYM | - | SYMDEF | PUTSYM | GETSYM | BLKDAT | | | | |
| INTURD | - | CONVRT | | 3013111 | DEADAI | | | | |
| IOCKPT | - | WRTCHK | TSKXQT | RUCOMS | RDEFIL | | | | |
| IOFILE | - | WRTFIL | WRTCHK | SYMDEF | STRTUP | PUTSYM | BLKDAT | | |
| | | MOVFIL | GETSYM | ERROR | CLSFIL | RUCOUS | RDEFIL | PUTSYM | OPNFIL |
| IOFLS | - | RWCOMS | | 4 | CE 37 1C | BLKDAT | | | |
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| IORDER | - | PUTSYM | GETSYM | FNDREC | | | | | |
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| 105CR1 | - | SYMBEF | PUTSYM | BLKDAT | | | | | |
| IOSCRZ | - | SYMDEF | PUTSYM | BLKDAT | | | | | |
| IOSTOR | - | SYMDEF | STRTUP | | | | | | |
| IOSYMB | • | SYMDEF | BLKDAT | | | | | | |
| IOTASK | - | BLKDAT | | | | | | | |
| IPAREN | - | DMPDRV | | | | | | | |
| IPASS | - | TSKXQT | SYMDEF | GETARG | FLOORY | DMPDRV | | | |
| IPER | - | BLKDAT | | | | •• | | | |
| IPERF | - | PUTKWY | | | | | | | |
| IPLOT | • | FLDDRV | | | | | | | |
| IPLTAG | - | GETGEO | FLDDRV | BLKDAT | | | | | |
| IPLUS | - | DMPDRV | BLKDAT | | | | | | |
| IPTOUF | - | BLKDAT | | | | | | | |
| IPTS | - | BLKDAT | | | | | | | |
| IPTIBL | - | BLKDAT | | | | | | | |
| IPURZ IP1 | - | IBITCK | | | | | | | |
| 19217 | - | PAGPLT | | | | | | | |
| 18 | - | SET | GETGEO | BLKDAT | | | | | |
| IRCI | _ | PUTSYM | GETSYM | FLDOUT | | | | | |
| IRCZ | _ | PUTSYM | GETSYM | | | | | | |
| IREAD | - | PUTSYM | GETSYM | | | | | | |
| IREC | - | GETSYM | | • | | | | | |
| IRECFS | _ | PUISYM | GETSYM | FNDREC | | | | | |
| IRECHO | _ | PUTSYM PUTSYM | | | | | | | |
| IRECHW | _ | PUTSYM | 6872V# | | | | | | |
| IRECST | - | GETSYM | GETSYM | | | | | | |
| IRECT | _ | PUISYM | GETSYM | £1 00 | | | | | |
| IREC2 | - | PUTSYM | GETSYM | FLOOUT | | | | | |
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IRIGHT IROWA DMPDRV FLDDRV

BLKDAT

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IUPPER

FLBDRY PUTSYM

GETSYM

FNDREC

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| | | SYMBEF | SIRTUP | STATOT | MITATE | STATEN | SHELL | PAGPLT | OPNFIL |
| | | SCALEZ | RWFILS | RWCOMS | RDEFIL | PUTSYM | PUIKUV | GETGEO | GETARG |
| | | MOVFIL | MAIN | TRITCK | GEISYM | GETKHY | GETKUD | CLSFIL | BLKDAT |
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INDEX ****** SUPER INDEX ****** BLKDAT MAXPIS MAXRAD BLKDAT TSKXQT BLKDAT MAXSEG BLKDAT PUTSYM MAXSTR SYMDEF PUTSYM GETSYM MAXWED PUISYM MAXO SYMDEF RWCOMS MDLE FNDREC GETSYM PUTSYM MINO MKMX BLKDAT MN FNDREC HOO STRTUP PAGPLT IBITCK GETGEO PUTSYM BLKDAT STRTUP STATEN MODCHK WRTCHK MODLST STRTUP STATFN BLKDAT MODMAX BLKDAT MAIN STATEN STRTUP MODNAM WRTCHK MODNON STRTUP FNDREC GETSYM MORE PUTSYM MOVE MOVFIL GETSYM STRTUP PUTSYM **MOVFIL** MOVWED PUTSYM MOVFIL STATIN STATOT MSAVE MUL OPR DMPDRV MXANCT BLKDAT MXARGS TSKXQT BLKDAT BLKDAT MXARGT MXCDFG BLKDAT BLKDAT MXCYAR MXDPCT BLKDAT MXECAR BLKDAT BLKDAT MXEXFP MXEXPD BLKDAT BLKDAT MXFPCT MXINCT BLKDAT BLKDAT TAMEN MXPLAR BLKDAT BLKDAT ASSIGN RESUES MXSYMU BLKDAT MXWALK WLKBCK RWCOMS BLKDAT SCALEZ M1 **SCALE3** M2 SCALE 3 SCALEZ PUTSYM SYMUPD SYMDEF STATOT STATIN SCALE 3 SCALES N TSKXQT DMPDRV FLDDRV FLDOUT PAGPLT MOVFIL LUSTAT GETARG PUTSYM GETSYM FNDREC SYMUPD NA SCALE3 SCALEZ NAL FLDDRY NAM NAMCOM RWCOMS NAMBAT TSKXQT NAMDEF BLKDAT

STATIN

NAME

SYMDEF

GETKWD

STRTUP

FLDDRV

STATOT

GETKWV

PUTKWV

RUCOMS

RWFILS

..... SUPER INDEX NAMEA FLDDRV BEMAN FLDDRV NAME YR GETGEO NAMFIL DMPDRV FLDOUT NAMFLD GETGEO NAMGEO TSKXQT MAIN NAMMOD NAMOLD RWCOMS DMPDRV NAMOPR DMPDRV NAMOP1 NAMOPZ DMPDRV GETSYM NAMPRT NAMPTS BLKDAT BLKDAT TRCEBK RUCOMS MAIN WLKBCK NAMRIN FNDREC GETSYM NAMSAV PUTSYM ASSIGN WLKBCK NAMSB BLKDAT GETGEO NAMSEG TSKXQT SYSRIN SYSCHK SYMUPO SYMDEF TRCEBK WRTFIL WRTCHK TSKXQT MAMSUB SCALEZ SCALE3 STRTUP STATOT STATIN STATEN SHELL SET MOVFIL PUTSYM PUTKEV PAGPLT OPNFIL RDEFIL RWFILS RWCOMS GETARG FNDREC GETGEO IBITCK GETSYM GETKWV GETKID MAIN DMPDRV CLSFIL ASSIGN ERROR FLDOUT FLDDRV SETARG DMPDRV SYMUPD NAMSYM BLKDAT NAMTSK TSKXQT NARGPX BLKDAT BLKDAT NARGTB TSKXQT NARITH BLKDAT FLDDRY MBITA IBITCK FLDOUT NBITS RWFILS PUTSYM GETSYM FNDREC NBITWD NBLANK BLKDAT FLDOUT NBLK CONVET Nes MOVFIL **NBUFS** BLKDAT CONVET NBYTES BLKDAT NOTTSZ CONVET LUSTAT BLKDAT NCARD NCARDS BLKDAT BLKDAT NCCLAS BLKDAT CONVRT NCHAR NCHLIN PAGPLT BLKDAT GEIKWD NCODE BLKDAT GETKWV GETGEO FLDDRV GETKWD TSKXQT PUTKWV NCODES BLKDAT NCOL NCOLS SYMDEF SYMBEF DMPDRV NCOL1 DMPDRV NCOLZ BLKDAT NCOM BLKDAT NCOMCH NCOMMA BLKDAT

| INDE | X | | | | | | | | |
|-------------|---|------------------|--------|-------------------|-----------|--------|-----------|---------|--------|
| | | | ••• | 5u | PER INDEX | | | | |
| NCOMSZ | - | RWCOMS | | | | | | | |
| NEON | _ | BLKDAT | | | | | | | |
| NCONCH | - | BLKDAT | | | | | | | |
| NCON1 | _ | BLKDAT | | | | | | | |
| NCORN | - | GETGEO | | | | | | | |
| NOATEL | _ | TSKXQT | SYMUPD | SYMDEF | STRTUP | RWFILS | PUTSYM | GETSYM | GETGEO |
| | | GETARG | FNDREC | FLDOUT | FLDDRV | DMPDRV | BLKDAT | 9613111 | 961960 |
| NDATMX | _ | SYMDEF | BLKDAT | | | | 00,000 | | |
| NDEBUF | _ | BLKDAT | 00 | | | | | | |
| NDF | - | RWFILS | | | | | | | |
| NDFALT | _ | GETARG | | | | | | | |
| NDFILE | - | WRTFIL | SYMUPD | RWFILS | RDEFIL | PUTSYM | LUSTAT | FNDREC | CLSFIL |
| | | BLKDAT | | | | | | | |
| NDIG | - | BLKDAT | | | | | | | |
| NDIGIT | - | BLKDAT | | | | | | | |
| NDTASK | - | BLKDAT | | | | | | | |
| NDX | - | TSKXQT | PUTKWV | GETKWV | FLDDRV | | | | |
| NDXARG | - | GETARG | DMPDRV | | | | | | |
| MOXBLK | - | GETGEO | | | | | | | |
| NDXFLD | - | FLDOUT | | | | | | | |
| NDXINR | - | FLDDRV | | | | | | | |
| NDXKWD | - | PUTKWV | GETKWV | | | | | | |
| NDXKYW | - | DMPDRV | | | | | | | |
| NDXMID | - | FLDDRV | | | | | | | |
| NDXOUT | - | FLDDRY | | | | | | | |
| NE | - | FLDOUT | | | | | | | |
| NEAR | - | FLDOUT | | | | | | | |
| NEED | - | SYMDEF | FLDOUT | | | | | | |
| NENDCD | - | BLKDAT | | | | | | | |
| NEOFLG | - | SLKDAT | | | | | | | |
| NERCLI | - | BLKDAT | | | | | | | |
| NERCOD | - | GETKWD | BLKDAT | | | | | | |
| NERCON | - | BLKDAT | | | | | | | |
| NERDPN | - | BLKDAT | | | | | | | |
| NEREOF | - | BLKDAT | | | | | | | |
| NEREXD | - | BLKDAT | | | | | | | |
| NEREXF | - | BLKDAT | | | | | | | |
| NEREXP | - | BLKDAT | | | | | | | |
| NERINT | • | BLKDAT | | | | | | | |
| NERNAM | - | BLKDAT | | | | | | | |
| HEWDAT | • | SYMUPD | | | | | | | |
| NEWNAM | - | SYMUPD | | | | | | | |
| NEWSYM | - | SYMDEF | | | | | | | |
| HEXTI | - | PAGPLT | | | | | | | |
| MFILE | - | RWFILS | Aucomo | 647 × 1114 | | 50000 | 01 = 04 * | | |
| MFILES | - | SYMDEF | RWCOMS | PUTKWV | GETKWV | ERROR | BLKDAT | | |
| MFINCD | - | BLKDAT | | | | | | | |
| NFRAC NG | - | BLKDAT Floout | | | | | | | |
| MUA 1100 | _ | FLUUUI | | | | | | | |

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NPEL OO

NPEL CP

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NPEROD

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BLKDAT

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HLKDAT

PAGPLT NI NILEGL BLKDAT NINC FLDDRV MINT BLKDAT NITEPS STATEN SHELL NLETR BLKDAT NLOOPS TSKXQT BLKDAT HMNAPS BLKDAT NMOD PAGPLT NMSPTR BLKDAT **NMTIMS** BLKDAT NMURDS RWCOMS NOEND BLKDAT TSKXQT NOGOFG RWCOMS MAIN FLDDRV DMPDRV BLKDAT NOP TSKXQT NOPCOD TSKXQT GETARG FLDOUT FLDDRV DMPDRV BLKDAT NOPNAM CONVRI NOSTAT WRIFIL WRTCHK WLKBCK TSKXQT TRCE3K SYSRIN SYSCHK SYMUPD SYMDEF STRTUP STATOT STATIN STATFN SHELL SCALE 3 SET RWCOMS SCALEZ RWFILS ROEFIL PUISYM PUTKWV PAGPLT **OPNFIL** MOVFIL MAIN IBITCK GETSYM GETKWV GETKWD GETGEO GETARG FLDOUT FNDREC FLDDRV CON VR T ERROR DMPDRV CLSFIL BLKDAT ASSIGN NOTASK BLKDAT NP SCALE3 SCALEZ PUTSYM PAGPLT FLDOUT FLDDRV NPAREN BLKDAT NPATCH GETGEO BLKDAT NPDASV SYMDEF NPDATA SYMDEF STRTUP SYMUPD RWFILS PUTSYM GETSYM GETARG FNDREC FLDOUT FLDDRV DMPDRV BLKDAT NPEARG NPEDPC BLKDAT NPEDPL BLKDAT MPEDRM BLKDAT NPE L FO BLKDAT NPEKUD BLKDAT NPELAB BLKDAT NPELIT BLKDAT MPELML BLKDAT

INDEX ****** SUPER INDEX ******* NPESEX BLKDAT NPESYM BLKDAT NPETSK BLKDAT NPI FLDDRV NPIC FLDDRV NPL FLDOUT NPRBUF RWFILS MOVFIL FLDDRV NPRC NPRDEF BLKDAT NPRELM RWFILS PUTSYM GETSYM FNDREC NPRFPT FLDOUT FLODRY NPRHDR FLDOUT NPRPRT PUTSYM GETSYM FNDREC NPRPT BLKDAT NPRREC RWFILS TSKXQT PUISYM GETSYM FNDREC FLDOUT NPRSEG TSKXQT BLKDAT MPRSER BLKDAT NPSAV DMPDRV NPTASK TSKXQT NPTBUF BLKDAT NR FLDOUT NREAD WRICHK STRTUP RWFILS RWCOMS NRECS RWFILS PUTSYM NRNAMS STATFN BLKDAT ASSIGN NROWS SYMDEF NROW1 SYMDEF DMPDRV NROWZ DMPDRV NRSUBS STATEN RUCOMS BLKDAT NRTIMS STATIN STATFN RWCOMS BLKDAT SYMUPD NS SYMDEF RWFILS FLDOUT GETGEO NSAV FLDDRV NSCNER GETKWD BLKDAT NSH CONVRT NSHFTS BLKDAT NSYMBL SYMUPD SYMDEF NT TSKXQT BATH GETKWO BLKDAT NTALPH BLKDAT NTASK BLKDAT NTASKS BLKDAT NTDM BLKDAT NTOPF1 BLKDAT NTDPF2 BLKDAT NTEMPS RWFILS PUTSYM MOVFIL FLDOUT BLKDAT NTEND BLKDAT NTERR BLKDAT NTFLPT GETARG FLDDRV DMPDRV BLKDAT GETARG NTINT TSKXQT DMPDRV BLKDAT NTKEYW GETKWD DMPDRV BLKDAT NTPARG GETARG

INDEX ***** SUPER INDEX ******* NTPGTD BLKDAT NTSFMT BLKDAT NISKMX BLKDAT NTSKTO TSKXQT BLKDAT NTSYMB GETGEO GETARG DMPDRV BLKDAT NTTASK BLKDAT NTI FLDOUT NT1SAV FLDOUT NTZ FLDOUT NT2 SAV FLDOUT NUMARG TSKXQT SET FLDDRV DMPDRV BLKDAT NUMCHK BLKDAT WRTCHK NUMCOL PUTSYM NUMCOM RWCOMS NUMC YL GETGEO BLKDAT BLKDAT NUMECP GETGEO NUMGTD GETGEO BLKDAT NUMLFT RDEFIL NUMPLT GETGEO BLKDAT NUMPTS FLOOUT BLKDAT NUMREC RWFILS **FLDOUT** NUMROW PUTSYM FNDREC GETSYM NUMSB STATOT STATIN ASSIGM NUMSEG GETGEO BLKDAT NUMSUB WRTFIL WRTCHK TSKXQT TRCEBK SYSRIN SYSCHK SYMUPD SYMDEF STRTUP STATOT STATIN STATEN SHELL SET SCALEZ SCALE3 RWFILS RWCOMS RDEFIL PUTSYM PUTKWV PAGPLT OPNFIL MOVFIL MAIN IBITCK GETSYM GETKWV GETKUD GETGEO GETARG FNDREC FLDOUT FLDDRV ERROR DMPDRV ASSIGN **NUMSYM** GETARG TSKXQT **NUMTSK** OPNFIL NUMWIP BLKDAT NUMBER SYMDEF NVAL TSKXQT STRTUP RWFILS PUTKWY MAIN GETKWV GETKWD FLDOUT DMPDRV BLKDAT NVALMX GETKWD BLKDAT MM CONVRT NWDSIZ CONVRT BLKDAT NWERE GETGEO BLKDAT NWORD CONVRT NWORDS WRTFIL RDEFIL NX SCALE3 SCALEZ MXINT PAGPLT NXTARG FLDDRY DMPDRV NXTSYM BLKDAT SYMDEF MXTTSK TSKXQT NXTHRD CONVRT PAGPLT NXVAL PAGPLT NYINT NYV PAGPLT

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| | | | *** | ***** SU | PER INDEX | ******* | | | |
| NYVAL | - | PAGPLT | | | | | | | |
| NO | - | GETSYM | | | | | | | |
| N 1 | - | PUTSYM | FLDQUT | | | | | | |
| NZ | - | PUTSYM | FLDOUT | | | | | | |
| OPNFIL | - | WRTCHK | SYMDEF | STATFY | RWFILS | PUTSYM | | | |
| PAGPLT | - | FLDOUT | | | | | | | |
| PARTB | - | RWCOMS | | | | | | | |
| PCNT | - | STATEN | | | | | | | |
| PHS | - | FLDOUT | | | | | | | |
| PHSMAG | - | FLDDRV | | | | | | | |
| PTIME | - | TICHEK | STATOT | STATIN | | | | | |
| PTTBLE | - | BLKDAT | | | | | | | |
| PUTKWV | - | DMPDRV | | | | | | | |
| PUTSYM | - | WRTCHK | STRTUP | RWFILS | FLDDRV | OMPDRV | | | |
| PUR | - | FLDOUT | | | | | | | |
| PURDUN | - | FLOOUT | | | | | | | |
| PURMAX | - | FLDOUT | FLDDRV | | | | | | |
| PWRRAT | - | FLDOUT | | | | | | | |
| PWRSQ | - | FLDOUT | | | | | | | |
| R | - | DMPDRV | | | | | | | |
| RAD | - | FLDOUT | BLKDAT | | | | | | |
| RADMAX | - | FLDOUT | | | | | | | |
| RDEFIL | - | STRTUP | RWFILS | RWCOMS | PUTSYM | MOVFIL | GETSYM | | |
| ROTODG | - | FLODRY | | | | | | | |
| READ | - | RUCOMS | RDEFIL | LUSTAT | | | | | |
| REFH | - | STRTUP | PUTKWV | GETKWV | FLDDRV | BLKD4T | | | |
| REFV | - | STRTUP | PUTKWY | GETKWV | FLDDRV | BLKDAT | | | |
| RETURN | - | WRTFIL | WRTCHK | MLKBCK | TSKXQT | TRCE3K | TICHEK | SYSRIN | SYSCHK |
| | | SYMUPD | SYMDEF | STRTUP | STATOT | STATIN | STATFN | SHELL | SET |
| | | SCALE3 | SCALEZ | RWFILS | RUC OMS | RDEFIL | PUISYM | PUIKWY | PAGPLT |
| | | OPNFIL | MOVFIL | LUSTAT | IBITCK | GETSYM | GETKWV | GETKWD | GETGEO |
| | | GETARG | FNDREC | FLDOUT | FLODRY | ERROR | DMPDRV | CONVRT | CLSFIL |
| | | ASSIGN | | | | | | | |
| RITEMS | - | STATFN | | | | | | | |
| ROPI | - | OMPORV | | | | | | | |
| ROPZ | - | DMPDRV | | | | | | | |
| RSTART | - | WRIFIL | WRTCHK | MFKBCK | TSKXQT | TRCESK | SYSCHK | SYMDEF | STRTUP |
| | | STATFN | RWFILS | RDEFIL | PUTSYM | PUTKWV | OPNFIL | MAIN | GETSYM |
| | | GETKWV | ERROR | BLKDAT | ASSIGN | | | | |
| RSTRTA | - | WRTFIL | WRTCHK | MLKBCK | TSKXQT | TRCEBK | SYSCHK | SYMDEF | STRTUP |
| | | STATEN | RWFILS | RDEFIL | PUISYM | PUIKWV | OPNFIL | MAIN | GETSYM |
| | | GETKWV | ERROR | BLKDAT | ASSIGN | | | | |
| RSUMS | - | STATOT | STATIN | STATFN | RWCOMS | BLKDAT | | | |
| RTINS | - | STATOT | STATIN | BLKDAT | | | | | |
| RUCOMS | - | WRTCHK | STRTUP | | | | | | |
| RUFILS | - | WRTCHK | STRTUP | | | | | | |
| SCALE | • | BLKDAT | | | | | | | |
| SCALES | • | BLKDAT | | | | | | | |
| SCALEZ | - | PAGPLT | | | | | | | |
| SCALES. | - | PAGPLT | | | | | | | |

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|---------|---|--------|--------|-----------|------------|---------|--------|--------|--------|
| SCNPR | - | RWCOMS | | | | | | | |
| SEGTAL | - | WRTCHK | 704407 | | | | | | |
| SET | _ | TSKXQT | TSKXQT | STRTUP | RWFILS | GETGEO | FLDDRV | BLKDAT | |
| SGMNT | _ | RUCONS | | | | | | | |
| SHELL | _ | STATEN | | | | | | | |
| SIGMA | - | PUTKWV | GETKWV | BLKDAT | | | | | |
| NIS | _ | FLDOUT | 46.44 | SCKUAI | | | | | |
| SMSTR | _ | RWCOMS | | | | | | | |
| SORT | _ | SET | GETGEO | FLDOUT | FLDDRV | BLKDAT | | | |
| SQRT | - | FLDOUT | FLDDRV | | COURT | DLKU41 | | | |
| SRAY | - | WRTCHK | | | | | | | |
| STATFN | _ | MAIN | ERROR | | | | | | |
| STATIN | - | WRTFIL | WRTCHK | TSKXQT | SYSRIN | SYSCHK | SYMUPD | SYMDEF | ***** |
| | | SET | SCALE3 | SCALEZ | RWFILS | RWCOMS | RDEFIL | PUISYM | STRTUP |
| | | PAGPLT | OPNFIL | MOVFIL | IBITCK | GETSYM | GETKWV | GETKWD | PUIKWV |
| | | GETARG | FNDREC | FLDOUT | FLDDRV | ERROR | DMPDRV | GEIKWO | GETGEO |
| STATCT | - | WRTFIL | WRTCHK | TSKXQT | SYSRIN | SYSCHK | SYMUPD | SYMDEF | STRTUP |
| | | SET | SCALE3 | SCALEZ | RWFILS | RWCOMS | ROEFIL | PUTSYM | PUTKEY |
| | | PAGPLT | OPNFIL | MOVFIL | IBITCK | GETSYM | GETKWV | GETKWD | GETGEO |
| | | GETARG | FNDREC | FLOOUT | FLDDRV | ERROR | DMPDRV | 951440 | GEIGEO |
| STOP | - | WRTFIL | WLKBCK | TSKXQT | SYSCHK | SYMUPD | SYMDEF | STRTUP | RWFILS |
| | | RDEFIL | PUTSYM | PUTKWV | OPNFIL | MOVFIL | MAIN | GETSYM | GETKWV |
| | | GETARG | FNDREC | FLDOUT | FLDDRV | DMPDRV | ****** | •••• | 46.484 |
| STRTUP | - | MAIN | | | | | | | |
| SUBOPR | - | DMPDRV | | | | | | | |
| SYMDEF | - | TSKXQT | PUTSYM | FLDDRV | DMPDRV | | | | |
| SYMUPD | - | TSKXQT | FLDDRV | | | | | | |
| SYSCHK | - | TSKXQT | | | | | | | |
| SYSFL | - | RWCOMS | | | | | | | |
| SYSLST | - | WRTFIL | WRICHK | MTKBCK | TSKXQT | TRCEBK | SYSCHK | SYMDEF | STRTUP |
| | | STATER | RWFILS | RDEFIL | PUTSYM | PUTKWV | OPNFIL | MAIN | GETSYM |
| | _ | GETKWV | ERROR | BLKDAT | ASSIGN | | | | |
| SYSRIN | - | MAIN | | | | | | | |
| TEMO | _ | WRICHK | TICHEK | | | | | | |
| TEMP | - | WRICHK | SYMDEF | RWFILS | RWCOMS | PUTSYM | MOVFIL | MAIN | FLDOUT |
| TICHEK | _ | FLDDRV | DMPDRV | BLKDAT | | | | | |
| TIMCHK | _ | WRTCHK | TSKXQT | SYSCHK | | | | | |
| TIME | _ | SYSCHK | *** | | | | | | |
| TIMIN | - | SYSRIN | MAIN | | | | | | |
| TIMOUT | _ | STATIN | | | | | | | |
| TIMTGO | - | SYSCHK | PUTKWV | GETKWV | BLUBAT | | | | |
| TLAST | _ | TICHEK | SYSCHK | 9617314 | BLKDAT | | | | |
| TMPBUF | - | PUTSYM | GETSYM | | | | | | |
| TNOW | - | TSKXQT | SYSCHK | | | | | | |
| TOTAL | _ | STATEN | 3.36 | | | | | | |
| TPCEPL | - | BLKDAT | | | | | | | |
| TRACE | - | MAIN | | | | | | | |
| TRACST' | - | WRIFIL | WRICHK | WLKSCK | TSKXQT | TRCE3K | SYSRTN | SYSCHK | |
| | | SYMDEF | STRTUP | STATOT | STATIN | STATEN | SHELL | 212CHK | SYMUPD |
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| | | MOVFIL | MAIN | IBIICK | GETSYM | GETKWV | GETKWD | GETGEO | GETARG |
| | | FNDREC | FLDOUT | FLDDRV | ERROR | DMPDRV | CONVRT | CLSFIL | BLKDAT |
| | | ASSIGN | | , 620 | • | | •••• | | |
| TRCEBK | _ | MEKBCK | ERROR | | | | | | |
| TS | - | TICHEK | | | | | | | |
| TSKXQT | _ | MAIN | | | | | | | |
| TSUMS | _ | BLKDAT | | | | | | | |
| TTINS | - | BLKDAT | | | | | | | |
| TWOPI | - | PUTKWV | BLKDAT | | | | | | |
| U | - | FLDDRV | | | | | | | |
| UPDBLK | _ | WRTCHK | TSKXQT | STRTUP | RWFILS | GETGEO | FLDDRV | BLKDAT | |
| VAL | - | TSKXQT | STRTUP | RWFILS | PUTKWV | MAIN | GETKWV | GETKWD | FLDOUT |
| | | DMPDRV | BLKDAT | | | | Q 2 | •••• | |
| VALUKW | - | PUTKWV | GETKWV | | | | | | |
| VINT | - | SCALES | SCALES | | | | | | |
| WAVLGH | - | PUTKWV | JUNELL | | | | | | |
| MAVNUM | _ | PUTKWV | | | | | | | |
| MTKBCK | - | WRTFIL | WRTCHK | FSKXQT | SYSRIN | SYSCHK | SYMUPD | SYMDEF | STRTUP |
| WENDER | | SET | SCALE 3 | SCALEZ | RWFILS | RWCOMS | RDEFIL | PUTSYM | PUTKWV |
| | | PAGPLT | OPNFIL | MOVFIL | IBITCK | GETSYM | GEIKWV | GETKWD | GETGEO |
| | | GETARG | FNDREC | FLDOUT | FLDDRV | ERROR | DMPDRV | 9211130 | 42.420 |
| WORDS | _ | WRTFIL | WRICHK | MFKBCK | TSKXQT | TRCESK | SYSRTN | SYSCHK | SYMUPD |
| 40.03 | | SYMDEF | STRTUP | STATOT | STATIN | STATEN | SHELL | SET | SCALES |
| | | SCALES | RWFILS | RWCOMS | RDEFIL | PUTSYM | PUIKWV | PAGPLT | OPNFIL |
| | | MOVFIL | MAIN | 1917CK | GETSYM | GETKWV | GETKWD | GETGEO | GETARG |
| | | FNDREC | FLDOUT | FLOORY | ERROR | DMPDRV | CONVRI | CLSFIL | BLKDAT |
| | | ASSIGN | | | Canon | | | | JENJ M. |
| WRITE | - | URTFIL | WRICHK | MFKBCK | TSKXQT | TRCESK | SYSCHK | SYMUPD | SYMBEF |
| | | STRTUP | STATOT | STATIN | STATEN | SCALES | SCALE 2 | RWFILS | RWCOMS |
| | | RDEFIL | PUTSYM | PUTKWV | PAGPLT | OPNFIL | MOVFIL | MAIN | GETSYM |
| | | GETKWV | GETGEO | GETARG | FNDREC | FLDOUT | FLDDRV | DMPDRV | ASSIGN |
| WRTCHK | _ | TSKXQT | SYSCHK | STATEN | ERROR | | | • • | |
| WRTFIL | - | WRICHK | RWFILS | RWCOMS | PUTSYM | | | | |
| × | - | PAGPLT | FLDOUT | | | | | | |
| XMAX | - | SCALES | SCALES | PAGPLT | FLDOUT | | | | |
| XMAXL | - | SCALES | | | | | | | |
| XMAXP | - | SCALE3 | SCALE2 | PAGPLT | | | | | |
| MINX | _ | SCALES | SCALEZ | PAGPLT | FLDOUT | | | | |
| XMINL | _ | SCALES | 30MCCE | | | | | | |
| XMINP | _ | SCALES | SCALEZ | PAGPLT | | | | | |
| XP | - | PAGPLT | JUNECE | , | | | | | |
| XVAL | _ | PAGPLT | | | | | | | |
| XWORDS | _ | WRTFIL | RDEFIL | | | | | | |
| Y | - | PAGPLT | FLDOUT | | | | | | |
| YMAX | - | PAGPLT | | | | | | | |
| YMAXP | - | PAGPLT | | | | | | | |
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CHAPTER III COMDECK VARIABLES GLOSSARY

The COMDECK variables glossary contains the listings of all common decks used in the GEMACS code. The FORTRAN named common variables are presented in alphabetical order. A common block/subroutine location index follows that for each module. Then the variables are defined for each common block, including the common executable FORTRAN statements blocks.



| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|---------|-----------|---------|--|
| A | | GEOMEL. | | · | |
| AA | | CAFT | | | |
| ANUMK | | ANUM | | | |
| ANUML | | ANUM | | | |
| AREA | | (NYZIJ | | | |
| AS | | ⊌TD | | | |
| 8 | | AMPZIJ | | | |
| В | | GEOMEL | | | |
| 88 | | CYLIN | | | |
| BCD | (1-168) | BNDRCL | | | |
| BD | (1-168) | BNDFCL | | | |
| BTDC | (1-336) | BNDDCL | | | |
| BTI | (1-56) | BNDICL | | | |
| BTS | (1-4) | BNDSCL | | | |
| CABI | | AMPZIJ | | | |
| CABJ | | AMPZIJ | | | |
| CAS | | GTD | | | |
| CHKPNT | | SYSFIL | BLKDAT | .FALSE. | |
| CHKWRT | | SYSFIL | BLKDAT | .FALSE. | |
| CJ | | COMP | BLKDAT | (0.,1.) | |
| CLITE | | AMPZIJ | BLKDAT | 299.79 | |
| CNC | (1-2) | GEOMEL | | | |
| COMPLT | | SYSFIL | BLKDAT | .FALSE. | |
| CPFRWD | | SYSFIL | BLKDAT | .TRUE. | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|-----------------|-------------|--------|-----------|-----------------------|
| CPI4 | | COMP | BLKDAT | (.70710678,-70710678) |
| CPS | | DIR | | |
| СТС | (1-2) | GEOMEL | | |
| CTHS | | DIR | | |
| CVAL | (1-60) | CSYSTM | BLKDAT | 0 |
| СХ | (1-10) | CSYSTM | | EQUIVALENCE CVAL |
| CY | (1-10) | CSYSTM | | |
| CZ _. | (1-10) | CSYSTM | | |
| D | (1-3) | DIR | | |
| DBGPRT | | ADEBUG | BLKDAT | .FALSE. |
| DDC | (1-168) | BNDDCL | | |
| DGTORD | | GEODAT | BLKDAT | 174.53293E-04 |
| DIK | | AMPZIJ | | |
| DIL | | AMPZIJ | | |
| DP | (1-2) | THPHUV | | |
| DPR | | PIS | BLKDAT | 57.2957795 |
| DT | (1-3) | THPHUV | | |
| DTDC | (1-84) | BNDDCL | | |
| DTI | (1-14) | BNDICL | | |
| DTS | | BNDSCL | | |
| Ε | (1-3) | FLDVAL | | |
| EFED | (1-361) | FEDDAT | | |
| ЕНРН | | FUDG | | |
| ЕНРНІ | | FUDGI | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|-----------|
| ЕНРНЈ | | FUDGJ | | |
| ЕНТН | | FUDG | | |
| EHTHI | | FUDGI | | |
| EHTHJ | | FUDGJ | | |
| EPHT | (1-361) | ESTOR | | |
| EPSR | | AMPZIJ | BLKDAT | 0.0 |
| ESPH | | FUDG | | |
| ESPHI | | FUDGI | | |
| ESPHJ | | FUDGJ | | |
| ESTH | | FUDG | | |
| ESTHI | | FUDGI | | |
| ESTHJ | | FUDGJ | | |
| ETA | | AMPZIJ | BLKDAT | 376.72727 |
| ETHT | (1-361) | ESTOR | | |
| EXIT1 | | AMPZIJ | | |
| EXIT2 | | AMPZIJ | | |
| EXRT1 | | AMPZIJ | | |
| EXRT2 | | AMPZIJ | | |
| EYIT1 | | AMPZIJ | | |
| EYIT2 | | AMPZIJ | | |
| EYRT1 | | AMPZIJ | | |
| EYRT2 | | AMPZIJ | | |
| EZIT1 | | AMPZIJ | | |
| EZIT2 | | AMPZIJ | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|--------------------|
| EZRT1 | | AMPZIJ | | |
| EZRT2 | | AMPZIJ | | |
| FACTOR | | SOURSF | | |
| FARFLD | | FLDVAL | | |
| FJ- | | AMPZIJ | BLKDAT | (0.0,1.0) |
| FLOPT | (1-3) | NEAR | | |
| FLTARG | (1-100) | ARGCOM | BLKDAT | 0.0 |
| FLTLIT | | PARTAB | | EQUIVALENCE LITHUM |
| FLTSYM | (1-100) | SYMSTR | BLKDAT | 0. |
| FNP | (1-84) | FNANG | | |
| FRQGLA | | LAST | | |
| FRQMHZ | | AMPZIJ | | |
| FX | | FLDXYZ | | |
| FY | | FLDXYZ | | |
| FZ | | FLDXYZ | | |
| GAREA | | SEGMNT | | |
| H | | FARP | | |
| HAW | | FARP | | |
| HFED | (1-361) | FEDOAT | | |
| IANG | | DOUBLE | | |
| IAXIS | (1,2,3) | GEODAT | BLKDAT | 24,25,26 |
| IBLANK | | SCNPAR | BLKDAT | 9 |
| IBSCER | | BSCERR | | |
| ICALL | | ADEBUG | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|---------------------|
| ICOMMA | | SCNPAR | BLKDAT | 10 |
| ICO1 | | AMPZIJ | | |
| 1002 | | AMPZIJ | | |
| ICTYPE | | FLD/AL | | |
| ICYTAG | | GTODAT | BLKDAT | 20002 |
| ID | | GĩD | | |
| IDCSYS | (1-10) | CSYSTM | BLKDAT | 0 |
| IDD | (1-361) | DOUBLE | | |
| IDEFIN | (1-500) | DEFDAT | BLKDAT | 0 |
| IDFINS | | DEFDAT | BLKDAT | 0 |
| IDG | (1-84) | DOUBLE | | |
| IDIG | (1-10) | SCNPAR | BLKDAT | 1,2,3,4,5,6,7,8,9,0 |
| IDOLAR | | SCNPAR | BLKDAT | 7 |
| IDUMMY | (1-9) | ADEBUG | | |
| IECTAG | | GTDDAT | BLKDAT | 20003 |
| IEH | | EHFLD | | |
| IEQUAL | | SCNPAR | BLKDAT | 8 |
| IERRF | | ADEBUG | BLKDAT | 0 |
| IGDNLA | | LAST | | |
| IGNORE | | SCNPAR | BLKDAT | 1 |
| IJ | | TMI | | |
| ILEFT | | SCNPAR | BLKDAT | 5 |
| IM | | FARP | | |
| IM | | SRC | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--------------------------------------|--|--|---------------------------|
| IMDCHK | | ADEBUG | BLKDAT | 0 |
| IMINUS | | SCNPAR | BLKDAT | 2 |
| INCCHK | | SYSFIL | | |
| INDXWB | | ADEBUG | BLKDAT | 1 |
| INTARG | (1-100) | ARGCOM | | EQUIVALENCE FLTARG |
| INTSYM | (1-100) | SYMSTR | BLKDAT | EQUIVALENCE FLTSYM |
| INTVAL | | SCNPAR | | |
| IOCKPT | | SYSFIL | BLKDAT | 7 |
| IOFILE | (1) (2) (3) (4-6) (7-99) | IOFLES IOFLES IOFLES IOFLES IOFLES | BLKDAT BLKDAT BLKDAT BLKDAT BLKDAT | -1 -1 -1 0 -1 |
| IOSCR1 | | SYSFIL | BLKDAT | 1 |
| IOSCR2 | | SYSFIL | BLKDAT | 2 |
| IOSYMB | | SYSFIL | BLKDAT | 8 |
| IOTASK | | SYSFIL | BLKDAT | 4 |
| IPASS | | ARGCOM | | |
| IPATCH | | TMI | | |
| IPER | | SCNPAR | BLKDAT | 11 |
| IPERF | | AMPZIJ | | |
| IPLTAG | | STODAT | BLKDAT | 20001 |
| IPLUS | | SCNPAR | BLKDAT | 1 |
| IPSARG | | SCNPAR | | |
| IPSDAT | | SCNPAR | | |
| IPSLIT | | SCNPAR | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--|--|---|--|
| IPSL00 | | SCNPAR | | |
| IPSTSK | | SCNPAR | | |
| IPTBUF | | PNTTBL | BLKDAT | 1 |
| IPTS | | PNTTBL | BLKDAT | 0 |
| IPTTBL | (1-400) | PNTTBL | BLKDAT | EQUIVALENCE PTTBLE |
| IP217 | | GEODAT | BLKDAT | 131072 |
| IRFLC | (1-3) | GEODAT | | |
| IRIGHT | • | SCNPAR | BLKDAT | 6 |
| IRSTRT | | ADEBUG | | |
| ISCALE | (1,2,3) | GEODAT | BLKDAT | 404,590,205 |
| ISEG | (2,2,0) | SEGMNT | BLKDAT | 0 |
| ISEQ | (1-100) | GEODAT | DERDAT | o |
| ISETTB | (1-5) (6-10) (11-15) (16-20) (21-25) (26-30) (31-35) (36-40) (41-45) (46-50) (51-55) (56-60) (61-65) (66-70) (71-75) (76-80) (81-85) (86-90) (91-95) (96-100) (101-105) (106-110) | INTMAT | BLKDAT | 136,127,123,126,124 125,143,127,130,141 128,129,135,131,132 133,134,137,140,138 139,0,2,3,4 5,6,7,8,9 10,11,12,13,14 15,16,17,18,19 20,21,22,0,18 9,4,5,6,7 8,9,13,11,12 13,18,15,16,17 18,19,22,21,22 0,0,0,1,1 1,1,1,1,0 2,2,2,0,3 3,3,3,4,0 5,5,0,0,0 2,3,4,5,6 7,0,1,2,3 0,1,2,3,4 1,0,1,2,0 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|------------------------------------|
| ISGTBL | (1-5500) | SEGMNT | BLKDAT | EQUIVALENCE SEGTBL |
| ISLASH | | SCNPAR | BLKDAT | 4 |
| ISOFF | | ADEBUG | BLKDAT | 0 |
| ISON | | ADEBUG | BLKDAT | 1 |
| ISRCE | | FLDVAL | | |
| ISTAR | | SCNPAR | BLKDAT | 3 |
| ISUBR | | ADEBUG | | |
| ISYMBL | (1-11) | SCNPAR | BLKDAT | +,-,*,/,(,),\$,=, ,,,., |
| ITAGID | (1-3) | GTDDAT | | EQUIVALENCE IPLTAG, ICYTAG, IECTAG |
| ITASK | | ADEBUG | | |
| ITEMP | (1-5500) | TEMPO1 | | EQUIVALENCE TEMP |
| ITYPDE | | GEODAT | BLKDAT | 262 |
| ITYPPL | | GEODAT | BLKDAT | 1036 |
| ITYPPT | | GEODAT | BLKDAT | 1044 |
| ITYPTG | | GEODAT | BLKDAT | 1287 |
| IWORDS | (1-20) | ADEBUG | BLKDAT | 0 |
| IWRTCK | | ADEBUG | | |
| JBIAS1 | | SEGMNT | BLKDAT | 40000 |
| JBIAS2 | | SEGMNT | BLKDAT | 60000 |
| JBIAS3 | | SEGMNT | BLKDAT | 80000 |
| JCBIAS | | SEGMNT | BLKDAT | 20000 |
| JC01 | | AMPZIJ | | |
| JC02 | | AMPZIJ | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|---------|-----------|---------------------|
| JDIG | (1-10) | SCNPAR | BLKDAT | 1,2,3,4,5,6,7,8,9,0 |
| JIX | (1-50) | JUNCOM | | |
| JIZ | (1-50) | JUNCOM | | |
| JOX | (1-50) | JUNCOM | | |
| JOZ | (1-50) | JUNCOM | | |
| KBBAND | | PARTAB | BLKDAT | 7 |
| KBBITS | (1-15) | PARTAB | BLKDAT | 0 |
| KBCPLX | | PARTAB | BLKDAT | 3 |
| KBDPRE | | PARTAB | BLKDAT | 4 |
| KBFFLD | | PARTAB | BLKDAT | 20 |
| KBFULL | | PARTAB | BLKDAT | 5 |
| KBGEOM | | PARTAB | BLKDAT | 13 |
| KBINTP | | SCNPAR | BLKDAT | 1 |
| KBLEFT | | PARTAB | BLKDAT | 8 |
| KBLOAD | | PARTAB | BLKDAT | 18 |
| KBLWRT | | PARTAB | BLKDAT | 10 |
| KBNFLD | | PARTAB | BLKDAT | 19 |
| KBORDR | | PARTAB | BLKDAT | 9 |
| KBPVIT | | PARTAB | BLKDAT | 12 |
| KBREAL | | PARTAB | BLKDAT | 2 |
| KBSNGL | | PARTABL | BLKDAT | 0 |
| KBSOLN | | PARTAB | BLKDAT | 16 |
| KBSRCE | | PARTAB | BLKDAT | 14 |
| KBSYM | | PARTAB | BLKDAT | 6 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|---------|
| KBSYMY | | PARTAB | BLKDAT | 17 |
| KBTEXT | | PARTAB | BLKDAT | 1 |
| KBUPRT | | PARTAB | BLKDAT | 11 |
| KBZIMP | | PARTAB | BLKDAT | 15 |
| KCHKPT | | SCNPAR | BLKDAT | 2 |
| KINPUT | | SCNPAR | BLKDAT | 4 |
| KJFLD | | INTMAT | BLKDAT | .FALSE. |
| KJGTD | | INTMAT | BLKDAT | .FALSE. |
| KJINT | (1-18) | INTMAT | | |
| KJMOM | | INTMAT | BLKDAT | .TRUE. |
| KOLAST | | PARTAB | BLKDAT | 4 |
| KOLBIT | | PARTAB | BLKDAT | 5 |
| KOLCNT | | PARTAB | BLKDAT | 4 |
| KOLCOD | | PARTAB | BLKDAT | 1 |
| KOLCOL | | PARTAB | BLKDAT | 7 |
| KOLFST | | PARTAB | BLKDAT | 3 |
| KOLLBL | | PARTAB | BLKDAT | 1 |
| KOLLNK | | PARTAB | BLKDAT | 8 |
| KOLLOC | | PARTAB | BLKDAT | 2 |
| KOLNAM | | PARTAB | BLKDAT | 1 |
| KOLROW | | PARTAB | BLKDAT | 6 |
| KOLTIM | | PARTAB | BLKDAT | 3 |
| KOLTSK | | PARTAB | BLKDAT | 2 |
| KOLVAL | | PARTAB | BLKDAT | 2 |

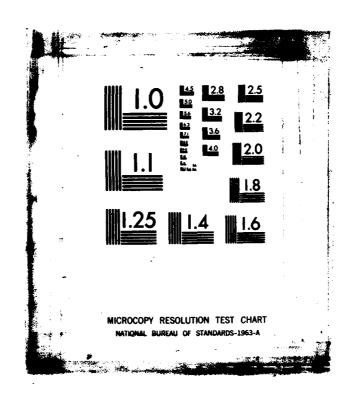
| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--|--|---|--|
| KOUTPT | | SCNPAR | BLKDAT | 5 |
| KRSTRT | | SCNPAR | BLKDAT | 3 |
| KSYMDF | | SCNPAR | BLKDAT | 6 |
| KSYMP | | AMPZIJ | | |
| KWABS | | PARTAB | BLKDAT | 22 |
| KWARG | (1-5) (6-10) (11-15) (16-20) (21-25) (26-30) (31-35) (36-40) (41-45) (46-50) (51-55) (56-60) (61-65) (66-70) (71-75) (76-80) (81-85) (86-90) (91-95) (96-100) (101-105) (106-110) (111-115) (116-118) (119-122) (123-127) (128-132) (133-137) (138-143) (144-150) | PARTAB | BLKDAT | 0,-2,-3,0,0 -2,-13,-2,0,-2 -2,-66,0,-1,-2 -2,-9,-5,-6,-15 -14,-2,0,-2,-2 -66,-11,-11,-2,-2 -2,0,-26,0,0 -2,-10,-358,-9,-9 -6,-6,0,-3,-6 46,-6,-6,-6,-5 -3,-5,0,54,55 56,57,58,59,-6 0,0,63,64,-9 -5,67,-6,-6,-5 0,-6,-6,0,0 76,-9,0,0,0 81,82,-5,84,-9 -6,-6,-165,0,0 -6,-6,-6,-6,0 0,-6,-6,0,0 101,102,103,-5,-5 -5,-1,0,0,-6 -6,-6,-6,-6 -6,117,118 0 123,124,125,126,127 128,129,130,131,132 133,134,135,136,137 138,139,140,141,142,143 -9,0,0,0,0,0,0 |
| KWAXIS | | PARTAB | BLKDA? | 40 |
| KWBAND | | PARTAB | BLKDAT | 2 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|-------|
| KWBCRE | | PARTAB | BLKDAT | 119 |
| KWBCSB | | PARTAB | BLKDAT | 1 |
| KWBNDW | | PARTAB | BLKDAT | 41 |
| KWC | | PARTAB | BLKDAT | 42 |
| KWCD | | PARTAB | BLKDAT | 133 |
| KWCDP | | PARTAB | BLKDAT | 43 |
| KWCHKP | | PARTAB | BLKDAT | 4 |
| KWCLPS | | PARTAB | BLKDAT | 5 |
| KWCNJG | | PARTAB | BLKDAT | 6 |
| KWCNVG | | PARTAB | BLKDAT | 17 |
| KWCOND | | PARTAB | BLKDAT | 104 |
| KWCPNC | | PARTAB | BLKDAT | 44 |
| KWCPNM | | PARTAB | BLKDAT | 45 |
| KWCR | | PARTAB | BLKDAT | 132 |
| KWCS | | PARTAB | BLKDAT | 141 |
| KWCW | | PARTAB | BLKDAT | 46 |
| KWCY | | PARTAB | BLKDAT | 130 |
| KWC1 | | PARTAB | BLKDAT | 47 |
| KWC2 | | PARTAB | BLKDAT | 48 |
| KWD | | PARTAB | BLKDAT | 49 |
| KWDBUG | | PARTAB | BLKDAT | 7 |
| KWDC | | PARTAB | BLKDAT | 134 |
| KWDM | (1-4) | PARTAB | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|---------------|------------|
| KWDP | | PARTAB | BLKDAT | 114 |
| KWDR | | PARTAB | BLKDAT | 110 |
| KWDT | | PARTAB | BLKDAT | 112 |
| KWDUMY | (1) | PARTAB | | |
| KWDW | | PARTAB | BLKDAT | 67 |
| KWDX | | PARTAB | BLKDAT | 111 |
| KWDY | | PARTAB | BLKDAT | 113 |
| KWDZ | | PARTAB | BLKDAT | 115 |
| KWEC | | PARTAB | BLKDAT | 142 |
| KWECC | | PARTAB | BLKDAT | 50 |
| KWED | | PARTAB | BLKDAT | 129 |
| KWEDRV | | PARTAB | | |
| KWEI | | PARTAB | BLKDAT | 140 |
| KWEND | | PARTAB | BLKDAT | 9 |
| KWEPSR | | PARTAB | BLKDAT | 105 |
| KWER | | PARTAB | BLKDAT | 128 |
| KWES | | PARTAB | BLKDAT | 139 |
| KWESRC | | PARTAB | BLKDAT | 11 |
| KWEU | | PARTAB | BLKDAT | 138 |
| KWEXPN | | PARTAB | | |
| KWFFLD | | PARTAB | BLKDAT | 13 |
| KWFLID | | PARTAB | BLKDAT | 51 |
| KWFMTP | (1-5) | PARTAB | BLKDAT | 1,6,0,15,0 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--|--|--|--|
| | (6-10) (11-15) (16-20) (21-25) (26-30) (31-35) (36-39) (40-105) (106) (107-121) (122) (123-150) | PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB | BLKDAT | 26,30,35,40,183 191,0,202,91,48 0,0,0,62,72 75,78,0,82,0 243,103,107,0,117 124,132,137,146,151 158,162,166,174 0 226 0 240 0 |
| KWFRQ | , | PARTAB | BLKDAT | 52 |
| KWGDAT | | PARTAB | | |
| KWGEOM | | PARTAB | | |
| KWGMDT | | PARTAB | BLKDAT | 14 |
| KWGTD | | PARTAB | BLKDAT | 136 |
| KWICOD | | PARTAB | | |
| KWILP | | PARTAB | BLKDAT | 99 |
| KWINPT | | PARTAB | BLKDAT | 145 |
| KWINV | | PARTAB | BLKDAT | 16 |
| KWIPE | | PARTAB | BLKDAT | 37 |
| KWIRE | | PARTAB | BLKDAT | 120 |
| KWIS | | PARTAB | BLKDAT | 53 |
| KWL | | PARTAB | | |
| KWLABL | | PARTAB | BLKDAT | 20 |
| KWLBW | | PARTAB | | |
| KWLGLG | | PARTAB | BLKDAT | 58 |
| KWLGLN | | PARTAB | BLKDAT | 57 |

GENERAL ELECTROMAGNETIC MODEL FOR THE ANALYSIS OF COMPLEX SYSTEMS (GEMACS. (U) BDM CORP ALBUQUERQUE NM D L KADLEC ET AL SEP 83 BDM/A-83-020-TR-VOL-3-PT-4 RADC-TR-83-217-VOL-3-PT-4 F30602-81-C-0084 F/G 20/14 4/5 MD-8137 510 UNCLASSIFIED NL



| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--|--|---|---|
| KWLGPO | | PARTAB | BLKDAT | 59 |
| KWLMT | | PARTAB | BLKDAT | 256 |
| KWLNLG | | PARTAB | BLKDAT | 55 |
| KWLNLN | | PARTAB | BLKDAT | 54 |
| KWLNPO | | PARTAB | BLKDAT | 56 |
| KWLOAD | | PARTAB | | |
| KWLOOP | | PARTAB | BLKDAT | 21 |
| KWLU | | PARTAB | BLKDAT | 60 |
| KWLUD | | PARTAB | BLKDAT | 8 |
| KWMAG | | PARTAB | | |
| KWMAX | | PARTAB | BLKDAT . | 146 |
| KWM | | PARTAB | BLKDAT | 137 |
| KWMODL | | PARTAB | BLKDAT | 144 |
| KWARG | | PARTAB | | |
| KWMXIT | | PARTAB | BLKDAT | 19 |
| KWN | | PARTAB | BLKDAT | 61 |
| KNNAME | (1-5) (6-10) (11-15) (16-20) (21-25) (26-30) (31-35) (36-40) (41-45) (46-50) (51-55) (56-60) (61-65) | PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB PARTAB | BLKDAT | 107,73,213,109,110 89,92,64,59,195 196,114,173,118,197 62,111,105,127,95 77,198,0,199,97 80,99,101,131,132 133,194,71,104,136 137,138,139,86,200 191,4,58,90,91 187,49,50,5,169 116,60,185,121,122 123,124,125,126,51 15,150,67,52,98 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|----------|-----------|------------------------------------|
| | (66-70) | PARTAB | BLKDAT | 170,201,152,153,19 |
| | (71–75) | PARTAB | BLKDAT | 69,53,54,55,82 |
| | (76–80) | PARTAB | BLKDAT | 175,70,83,16,84 |
| | (81-85) | PARTAB | BLKDAT | 188,202,177,178,85 |
| | (86-90) | PARTAB | BLKDAT | 158,159,23,160,25 |
| | (91–95) | PART. AB | BLKDAT | 163,164,165,166,148 |
| | (96–100) | PARTAB | BLKDAT | 27,167,168,61,203 |
| | (101–105) | PARTAB | BLKDAT | 135,100,130,74,75 |
| | (106–110) | PARTAB | BLKDAT | 184,140,204,205,206 |
| | (111-115) | PARTAB | BLKDAT | 207,208,209,210,211 |
| | (116-120) | PARTAB | BLKDAT | 212,214,215,220,221 |
| | (121-127) | PARTAB | BLKDAT | 222,223,224,225,226, 227,228 |
| | (128-133) | PARTAB | BLKDAT | 229,230,231,232,233, 234 |
| | (134–139) | PARTAB | BLKDAT | 235,236,237,238,239, 240 |
| | (140-150) | PARTAB | BLKDAT | 241,144,242,243,246, 94,129,4*0 |
| KWNFLD | | PARTAB | BLKDAT | 23 |
| KWMFL | | PARTAB | BLKDAT | 116 |
| KWP | | PARTAB | BLKDAT | 62 |
| KWNR | | PARTAB | BLKDAT | 117 |
| KWOFF | | PARTAB | BLKDAT | 63 |
| KHON | | PARTAB | BLKDAT | 64 |
| KMOUTP | | PARTAB | BLKDAT | 146 |
| KWPART | | PARTAB | BLKDAT | 25 |
| KWPC | | PARTAB | BLKDAT | 135 |
| KWPD | | PARTA8 | BLKDAT | 124 |
| KWPDR | | PARTAB | BLKDAT | 143 |
| KWPHI | | PARTAB | BLKDAT | 66 |
| KMPIVT | | PARTAB | BLKDAT | 65 |
| KMPL | | PARTAB | BLKDAT | 127 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|-------|--|
| KWPLOT | | PARTAB | BLKDAT | 26 | |
| KWPLSE | | PARTAB | BLKDAT | 102 | |
| KWPLT | | PARTAB | | | |
| KWPR | | PARTAB | BLKDAT | 123 | |
| KWPRE | | PARTAB | BLKDAT | 121 | |
| KWPRGE | | PARTAB | BLKDAT | 28 | |
| KWPRLC | | PARTAB | BLKDAT | 108 | |
| KWPRNT | | PARTAB | BLKDAT | 27 | |
| KWPSN | | PARTAB | BLKDAT | 103 | |
| KWPW | | PARTAB | | | |
| KWP1 | | PARTAB | BLKDAT | 68 | |
| KWP2 | | PARTAB | BLKDAT | 69 | |
| KMR | • | PARTAB | BLKDAT | 70 | |
| KWRC | | PARTAB | BLKDAT | 131 | |
| KWRD | | PARTAB | BLKDAT | 125 | |
| KWROP | | PARTAB | BLKDAT | 71 | |
| KWRDUC | | PARTAB | BLKDAT | 29 | |
| KWREAD | | PARTAB | BLKDAT | 15 | |
| KWREPL | | PARTAB | BLKDAT | 31 | |
| KWRFLC | | PARTAB | BLKDAT | 30 | |
| KWRITE | | PARTAB | BLKDAT | 24 | |
| KWRR | | PARTAB | BLKDAT | 126 | |
| KWRSTR | | PARTAB | BLKDAT | 32 | |
| KWR1 | | PARTAB | BLKDAT | 72 | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|-------|
| KWR2 | | PARTAB | BLKDAT | 73 |
| KWSC | | PARTAB | BLKDAT | 74 |
| KWSCDP | | PARTAB | BLKDAT | 75 |
| KWSEGS | | PARTAB | BLKDAT | 76 |
| KWSEQ | | PARTAB | BLKDAT | 77 |
| KWSET | | PARTAB | BLKDAT | 33 |
| KWSIZE | | PARTAB | BLKDAT | 78 |
| KNSMOF | | PARTAB | BLKDAT | 35 |
| KWSNCS | | PARTAB | BLKDAT | 101 |
| KWSOLV | | PARTAB | BLKDAT | 34 |
| KWSR | | PARTAB | BLKDAT | 79 |
| KNSRDP | | PARTAB | BLKDAT | 80 |
| KWSRLC | | PARTAB | BLKDAT | 109 |
| KNSTAT | | PARTAB | BLKDAT | 118 |
| KWSTNT | | PARTAB | BLKDAT | 122 |
| KWSW | | PARTAB | BLKDAT | 81 |
| KWTAG | | PARTAB | | |
| KWTAGS | | PARTAB | BLKDAT | 82 |
| KWTDM | | PARTAB | BLKDAT | 100 |
| KWTHET | | PARTAB | BLKDAT | 83 |
| KWTIME | | PARTAB | BLKDAT | 3 |
| KWTRAC | | PARTAB | BLKDAT | 84 |
| KVTRAN | | PARTAB | BLKDAT | 36 |
| KWTYPE | | PARTAB | BLKDAT | 85 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|-------|--|
| KWT1 | | PARTAB | BLKDAT | 86 | |
| KWT2 | | PARTAB | BLKDAT | 87 | |
| KWUBW | | PARTAB | | | |
| KWV | | PARTAB | BLKDAT | 88 | |
| KWVALU | | PARTAB | BLKDAT | 18 | |
| KWVS | | PARTAB | BLKDAT | 89 | |
| KWVSRC | | PARTAB | BLKDAT | 10 | |
| KWIPE | | PARTAB | | | |
| KWX | | PARTAB | BLKDAT | 90 | |
| KWXPND | | PARTAB | BLKDAT | 12 | |
| KWX1 | | PARTAB | BLKDAT | 91 | |
| KWX2 | | PARTAB | BLKDAT | 92 | |
| KWY1 | | PARTAB | BLKDAT | 93 | |
| KWY2 | | PARTAB | BLKDAT | 94 | |
| KWZ | | PARTAB | BLKDAT | 96 | |
| KWZCDS | | PARTAB | BLKDAT | 38 | |
| KNZCOD | | PARTAB | | | |
| KWZGEN | | PARTAB | BLKDAT | 39 | |
| KWZIMP | | PARTAB | BLKDAT | 95 | |
| KWZLDS | | PARTAB | BLKDAT | 106 | |
| KWZMAT, | | PARTAB | BLKDAT | 107 | |
| KWZ1 | | PARTAB | BLKDAT | 97 | |
| KNZ2 | | PARTAB | BLKDAT | 98 | |
| LB | | ADEBUG | | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--|--|--|---|
| LCALLR | | ADEBUG | BLKDAT | 0 |
| LCALIM | | ADEBUG | BLKDAT | 0 |
| LCHAR | | SCNPAR | | |
| LCORNR | | LOGDIF | | |
| LCYL | | LPLCY | | |
| LDC | (1-84) | LDCBY | | |
| LDEBUG | | TEST | | |
| LDRC | (1-84) | CLDRC | | |
| LETR | (1-5) (6-10) (11-15) (16-20) (21-26) | SCNPAR SCNPAR SCNPAR SCNPAR SCNPAR | BLKDAT BLKDAT BLKDAT BLKDAT BLKDAT | A,B,C,D,E F,G,H,I,J K,L,M,N,O P,Q,R,S,T U,V,W,X,Y,Z |
| LFRQFL | | SAME | | |
| LGONFL | | SAME | | |
| LGRND | | GROUND | | |
| LIHD | (1-196) | LSHDT | | |
| LITIOX | | PARTAB | BLKDAT | 50 |
| LITNUM | (1-100) | PARTAB | BLKDAT | 0 |
| LNRFLD | | NEAR | | |
| LOCAII | | FLDCOM | | |
| LOCAIR | | FLDCOM | | |
| LOCBII | | FLDCOM | | |
| LOCBIR | | FLDCOM | | |
| FOCCII | | FLDCOM | | |
| LOCCIR | | FLDCOM | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | ···· |
|----------|-------------|--------|-----------|-------|------|
| LOOPMX | | PARTAB | BLKDAT | 10 | |
| LPLA | | LPLCY | | | |
| LPRAD | | OUTPTD | | | |
| LRANG | | OUTPTD | | | |
| LRDC | (1-84) | CLRDC | | | |
| LRFC | | CLRFC | | | |
| LRFI | (1-14) | CLRFI | | | |
| LRFS | (1-14) | CLRFS | | | |
| LROUTN | | ADEBUG | BLKDAT | 0 | |
| LRTNUM | | ADEBUG | BLKDAT | 0 | |
| LSAVE | (1-5) | ADEBUG | | | |
| LSH0 | (1-14) | LSHDT | | | |
| LSLOPE | | LOGDIF | | | |
| LSRCFL. | | SAME | | | |
| LSRFC | (1-2) | SRFACC | | | |
| LSTAMP | | AMPZIJ | | | |
| LSTARG | | ARGCOM | | | |
| LSTASK | | SCNPAR | BLKDAT | 3 | |
| LSTAT | | ADEBUG | BLKDAT | 0 | |
| LSTCOL | | SCNPAR | BLKDAT | 80 | |
| LSTCSY | | CSYSTM | BLKDAT | 0 | |
| LSTD | (1-14) | LSHDP | | | |
| LSTDAT | | SCNPAR | BLKDAT | 1 | |
| LSTDEF | | DEFDAT | | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|-------|--|
| LSTFNC | | SCNPAR | BLKDAT | 0 | |
| LSTGEO | | GEODAT | | | |
| LSTINP | | SCNPAR | BLKDAT | 4 | |
| LSTINT | | SCNPAR | BLKDAT | 2 | |
| LSTI00 | | ADEBUG | BLKDAT | 20 | |
| LSTIOF | | IOFLES | | | |
| LSTMOD | | MODULE | | | |
| LSTPAR | | PARTAB | | | |
| LSTPTB | | PNTTBL | | | |
| LSTS | | LSHDP | | | |
| LSTSYS | (1-20) | SYSFIL | BLKDAT | 0 | |
| LSTTMP | | TEMPO1 | | | |
| LSTTPF | | SYSFIL | BLKDAT | 0 | |
| LSURF | (1-14) | SURFAC | | | |
| LTEST | | TEST | | | |
| LTRACE | | ADEBUG | BLKDAT | 0 | |
| LTRF | | FUDG | | | |
| LTRFI | | FUDGI | | | |
| LTRFJ | | FUDGJ | | | |
| LUDBUG | | ADEBUG | BLKDAT | 0 | |
| LUPRNT | | ADEBUG | BLKDAT | 6 | |
| LUTASK | | ADEBUG | BLKDAT | 5 | |
| LI | | FLDVAL | | | |
| L2 | | FLDVAL | | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|-------|--|
| L3 | | FLDVAL | | | |
| MACHIN | | ADEBUG | BLKDAT | 6181 | |
| MANTSA | | ADEBUG | BLKDAT | 27 | |
| MATCH | | SCNPAR | | | |
| MAXBLK | | SEGMNT | | | |
| MAXCDS | | SCNPAR | BLKDAT | 60 | |
| MAXCON | | JUNCOM | BLKDAT | 50 | |
| MAXCSY | | CSYSTM | BLKDAT | 10 | |
| MAXCYL | | GTDDAT | BLKDAT | 1 | |
| MAXDEF | | DEFDAT | BLKDAT | 100 | |
| MAXECP | | GTDDAT | BLKDAT | 2 | |
| MAXPLT | | GTDDAT | BLKDAT | 14 | |
| MAXPTS | | PNTTBL | BLKDAT | 100 | |
| MAXRAD | | SEGMNT | BLKDAT | 10 | |
| MAXSEG | | SEGMNT | BLKDAT | 500 | |
| MAXSTR | | SYMSTR | BLKDAT | 100 | |
| MEP | (1-14) | GEOPLA | | | |
| MCHX | | PARTAB | BLKDAT | 3 | |
| MLTJCT | | SEMME | | | |
| MODCHK | | SYSFIL | BLKDAT | 7 | |
| MODLST | (1-10) | MODULE | BLKDAT | 0 | |
| MODHAX | | MODULE | BLKDAT | 10 | |
| MODRAM | | MODULE | | | |
| MPH | | HITPLT | | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|---------------|------------------|-----------|-------------|
| MPX | | GEOPLA | | |
| MPXR | | GROUND | | |
| MXANCT | | SCNPAR | BLKDAT | 6 |
| MXARGS | | ARGCOM | 8LKDAT | 100 |
| MXARGT | | PARTAB | BLKDAT | 32 |
| MXCDFG | | SCNPAR | BKDAT | 0 |
| MXCYAR | | GTDDAT | BLKDAT | 6 |
| MXDPCT | | SCNPAR | BLKDAT | 28 |
| MXECAR | | GTDDAT | BLKDAT | 5 |
| MXEXFP | | SCNPAR | BLKDAT | 293 |
| MXEXPD | | SCNPAR | BLKDAT | 293 |
| MXFPCT | | SCNPAR | BLKDAT | 14 |
| MXINCT | | SCNPAR | BLKDAT | 18 |
| MXMAT | | PARTAB | BLKDAT | 6 |
| MXPLAR | | GTDOAT | BLKDAT | 20 |
| MXSUBS | | ADEBUG | BLKDAT | 200 |
| MXSYMB | | PARTAB | BLKDAT | 11 |
| MXWALK | | ADEBUG | BLKDAT | 28 |
| NAMOEF | | DEFDAT | BLKDAT | 4380508300 |
| NAMPTS | | PNTTBL | BLKDAT | 17516467457 |
| NAMRTN | (1) (2-28) | ADEBUG ADEBUG | BLKDAT | BLANK |
| NAMSEG | | SEGMNT | BLKDAT | 0 |
| NAMSRC | | FLOVAL | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--------------------|------------------|------------------|---|
| NAMTSK | (1-5) | PARTAB | BLKDAT | 57,107,190,108,109 |
| | (6-10) | PARTAB | BLKDAT | 88,89,92,112,59 |
| | (11-15) | PARTAB | BLKDAT | 113,114,94,119,120 |
| | (16-20) | PARTAB | BLKDAT | 95,77,96,128,78 |
| | (21–25) (26–30) | PARTAB | BLKDAT | 129,97,80,99,101 |
| | (31-35) | PARTAB PARTAB | BLKDAT BLKDAT | 131,132,133,134,71 104,136,137,138,139 |
| | (36-40) | PARTAB | BLKDAT | 87,61,117,86,180 |
| | (41-46) | PARTAB | BLKDAT | 184,184,173,203,195,19 |
| | (47–100) | PARTAB | BLKDAT | 223,53*1 |
| NARG | (1-10) | SCNPAR | | |
| NARGLM | | PARTAB | | |
| NARGMX | | PARTAB | BLKDAT | 1000 |
| NARGN | | PARTAB | | |
| NARGS | | SCNPAR | | |
| NARGT | (1-10) | SCNPAR | | |
| NARGTB | (1-1000) | PARTAB | BLKDAT | 0 |
| NARGTP | (1-10) | PARTAB | | |
| NARITH | | SCNPAR | BLKDAT | 3 |
| NBLANK | | SCNPAR | BLKDAT | 6 |
| NBYTES | | ADEBUG | BLKDAT | 6 |
| NBYTSZ | | ADEBUG | BLKDAT | 6 |
| NCARD | (1-81) | SCNPAR | BLKDAT | 1 BLANK |
| NCARDS | | SCNPART | BLKDAT | 0 |
| NCCARD | | SCNPAR | | |
| NCCLAS | | SCNPAR | BLKDAT | 0 |
| NCHAR | | SCNPAR | BLKDAT | 1 BLANK |
| NCIX | | JUNCOM | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|--|--|--|--|
| NCIZ | | JUNCOM | | |
| NCODE | (1-256) | SCNPAR | BLKDAT | 0 |
| NCODES | (1-256) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) | SCNPAR PARTAB | BLKDAT | 0 /ILLEGAL/ 1 /A/ 2 /B/ 3 /C/ 4 /D/ 5 /E/ 6 /F/ 7 /G/ 8 /H/ 9 /I/ 10 /J/ 11 /K/ 12 /L/ 13 /M/ 14 /N/ 15 /O/ 16 /P/ 17 /Q/ 18 /R/ 19 /S/ 20 /T/ 21 /U/ 22 /V/ 23 /W/ 24 /X/ 25 /Y/ 26 /Z/ 28 /1/ 29 /2/ 30 /3/ 31 /4/ 32 /5/ 33 /6/ 34 /7/ 35 /8/ 36 /9/ 27 /O/ 37 /+/ 38 /-/ 39 /*/ |
| | (41) (42) | PARTAB PARTAB | BLKDAT BLKDAT | 40 /// 41 /(/ |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|----------------------|
| | (43) | PARTAB | BLKDAT | 42 /)/ |
| | (44) | PARTAB | BLKDAT | 43 /\$/ |
| | (45) | PARTAB | BLKDAT | 44 /=/ |
| | (46) | PARTAB | BLKDAT | 45 /" "/ |
| | (47) | PARTAB | BLKDAT | 46 /" ." / |
| | (48) | PARTAB | BLKDAT | 46 /","/ 47 /"."/ |
| | (49) | PARTAB | BLKDAT | 220 /C1/ |
| | (50) | PARTAB | BLKDAT | 221 /C2/ |
| | (51) | PARTAB | BLKDAT | 789 /LU/ |
| | (52) | PARTAB | BLKDAT | 974 /ON/ |
| | (53) | PARTAB | BLKDAT | 1180 /R1/ |
| | (54) | PARTAB | BLKDAT | 1181 /R2/ |
| | (55) | PARTAB | BLKDAT | 1219 /SC/ |
| | (56) | PARTAB | BLKDAT | 1234 /SR/ |
| | (57) | PARTAB | BLKDAT | 4356 /ADD/ |
| | (58) | PARTAB | BLKDAT | 12560 /CDP/ |
| | (59) | PARTAB | BLKDAT | 21380 /END/ |
| | (60) | PARTAB | BLKDAT | 25745 /FRQ/ |
| | (61) | PARTAB | BLKDAT | 37648 /ILP/ |
| | (62) | PARTAB | BLKDAT | 37782 /INV/ |
| | (63) | PARTAB | BLKDAT | 49303 /LBW/ |
| | (64) | PARTAB | BLKDAT | 50500 /LUD/ |
| | (65) | PARTAB | BLKDAT | 53319 /MAG/ |
| | (66) | PARTAB | BLKDAT | 54407 /MRG/ |
| | (67) | PARTAB | BLKDAT | 61830 /OFF/ |
| | (68) | PARTAB | BLKDAT | 66324 /PLT/ |
| | (69) | PARTAB | BLKDAT | 74000 /RDP/ |
| | (70) | PARTAB | BLKDAT | 78161 /SEQ/ |
| | (71) | PARTAB | BLKDAT | 78164 /SET/ |
| | (72) | PARTAB | BLKDAT | 86167 /UBW/ |
| | (73) | PARTAB | BLKDAT | 529284 /BAND/ |
| | (74) | PARTAB | BLKDAT | 848772 /COND/ |
| | (75) | PARTAB | BLKDAT | 1377490 /EPSR/ |
| | (76) | PARTAB | BLKDAT | 3207236 /LQAD/ |
| | (77) | PARTAB | BLKDAT | 3208144 /LOOP/ |
| | (78) | PARTAB | BLKDAT | 3494676 /MULT/ |
| | (79) | PARTAB | BLKDAT | 4199572 /PART/ |
| | (80) | PARTAB | BLKDAT | 4244436 /PLOT/ |
| | (81) | PARTAB | BLKDAT | 4740108 /REPL/ |
| | (82) | PARTAB | BLKDAT | 4993296 /SCDP/ |
| | (83) | PARTAB | BLKDAT | 5019269 /SIZE/ |
| | (84) | PARTAB | BLKDAT | 5054736 /SRDP/ |
| | (85) | PARTAB | BLKDAT | 5346309 /TYPE/ |
| | (86) | PARTAB | BLKDAT | 6844750 /ZGEN/ |
| | (87) | PARTAB | BLKDAT | 6893908 /ZSET/ |
| | (88) | PARTAB | BLKDAT | 53544133 /CLPSE/ |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|------------------|-----------|----------------------|
| | (89) | PARTAB | BLKDAT | 54321799 /CONJG/ |
| | (90) | PARTAB | BLKDAT | 54563715 /CPINC/ |
| | (91) | PARTAB | BLKDAT | 54584653 /CPNUM/ |
| | (92) | PARTAB | BLKDAT | 68429127 /DEBUG/ |
| | (93) | PARTAB | BLKDAT | 151843077 /ICODE/ |
| | (94) | PAF.TAB | BLKDAT | 154731860 /INPUT/ |
| | (95) | PARTAB | BLKDAT | 201597260 /LABEL/ |
| | (96) | PARTAB | BLKDAT | 219488709 /MERGE/ |
| | (97) | PARTAB | BLKDAT | 268772622 /PARTN/ |
| | (98) | PARTAB | BLKDAT | 270885844 /PIVOT/ |
| | (99) | PARTAB | BLKDAT | 273191828 /PRINT/ |
| | (100) | PARTAB | BLKDAT | 273990853 /PULSE/ |
| | (101) | PARTAB | BLKDAT | 274014661 /PURGE/ |
| | (102) | PARTAB | BLKDAT | 303318339 /REDUC/ |
| | (103) | PARTAB | BLKDAT | 303316339 /REDUC/ |
| | (104) | PARTAB | BLKDAT | 322749829 /SOLVE/ |
| | (105) | PARTAB | BLKDAT | 369411397 /VALUE/ |
| | (106) | PARTAB | BLKDAT | 406852484 /XPAND/ |
| | (107) | PARTAB | BLKDAT | 2165126466 /BACSUB/ |
| | (108) | PARTAB | BLKDAT | 2302230608 /BINTAP/ |
| | (109) | PARTAB | BLKDAT | 3358393236 /CHKPNT/ |
| | (110) | PARTAB | BLKDAT | 3476096197 /COLPSE/ |
| | (111) | PARTAB | BLKDAT | 3476644999 /CONVRG/ |
| | (112) | PARTAB | BLKDAT | 4379702096 /DECOMP/ |
| | (113) | PARTAB | BLKDAT | 5675480084 /ERROPT/ |
| | (114) | PARTAB | BLKDAT | 5775561604 /EXPAND/ |
| | (115) | PARTAB | BLKDAT | 5775561619 /EXPANS/ |
| | (116) | PARTAB | BLKDAT | 6596612676 /FILEID/ |
| | (117) | PARTAB | BLKDAT | 7604040014 /GEOGEN/ |
| | (118) | PARTAB | BLKDAT | 7735350529 /GMDATA/ |
| | (119) | PARTAB | BLKDAT | 9904346260 /INVERT/ |
| | (120) | PARTAB | BLKDAT | 10003944709 /ITRATE/ |
| | (121) | PARTAB | BLKDAT | 13039616590 /LINLIN/ |
| | (122) | PARTAB | BLKDAT | 13039616967 /LINLOG/ |
| | (123) | PARTAB | BLKDAT | |
| | (124) | PARTAB | | 13039633170 /LINPLR/ |
| | (125) | PARTAB | BLKDAT | 13138444878 /LOGLIN/ |
| | (126) | PARTAB | BLKDAT | 13138445255 /LOGLOG/ |
| | (127) | PARTAB | BLKDAT | 13138461458 /LOGPLR/ |
| | (128) | PARTAB | BLKDAT | 13981750546 /MAXITR/ |
| | (129) | | BLKDAT | 14079837508 /MGNTUD/ |
| | (130) | PARTAB PARTAB | BLKDAT | 16463758676 /OUTPUT/ |
| | (131) | | BLKDAT | 17231589966 /PCESIN/ |
| | (132) | PARTAB PARTAB | BLKDAT | 19412373701 /REDUCE/ |
| | | | BLKDAT | 19412861140 /REFLCT/ |
| | (133) | PARTAB | BLKDAT | 19415482435 /REPLAC/ |
| | (134) | PARTAB | BLKDAT | 19416302740 /RESTRT/ |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|---------------|----------------------|
| | (135) | PARTAB | BLKDAT | 20555772883 /SINCOS/ |
| | (136) | PARTAB | BLKDAT | 20823949638 /SYMDEF/ |
| | (137) | PARTAB | BLKDAT | 21777147088 /TRANSP/ |
| | (138) | PARTAB | BLKDAT | 24851314004 /WIPOUT/ |
| | (139) | PARTAB | BLKDAT | 27971567955 /ZCODES/ |
| | (140) | PARTAB | BLKDAT | 28135736472 /ZMATRX/ |
| | (141) | PARTAB | BLKDAT | 84 /AT/ |
| | (142) | PARTAB | BLKDAT | 197 /CE/ |
| | (143) | PARTAB | BLKDAT | 208 /CP/ |
| | (144) | PARTAB | BLKDAT | 211 /CS/ |
| | (145) | PARTAB | BLKDAT | 261 /DE/ |
| | (146) | PARTAB | BLKDAT | 262 /DF/ |
| | (147) | PARTAB | BLKDAT | 334 /EN/ |
| | (148) | PARTAB | BLKDAT | 6853456 /ZIMP/ |
| | (149) | PARTAB | BLKDAT | 848 /MP/ |
| | (150) | PARTAB | BLKDAT | 912 /NP/ |
| | (151) | PARTAB | SLKDAT | 1044 /PT/ |
| | (152) | PARTAB | BLKDAT | 1052 /P1/ |
| | (153) | PARTAB | BLKDAT | 1053 /P2/ |
| | (154) | PARTAB | BLKDAT | 1153 /RA/ |
| | (155) | PARTAB | BLKDAT | 1158 /RF/ |
| | (156) | PARTAB | BLKDAT | 1166 /RN/ |
| | (157) | PARTAB | BLKDAT | 1176 /RX/ |
| | (158) | PARTAB | BLKDAT | 1308 /T1/ |
| | (159) | PARTAB | BLKDAT | 1309 /T2/ |
| | (160) | PARTAB | BLKDAT | 1427 /VS/ |
| | (161) | PARTAB | BLKDAT | 1490 /WR/ |
| | (162) | PARTAB | BLKDAT | 1548 /XL/ |
| | (163) | PARTAB | BLKDAT | 1564 /X1/ |
| | (164) | PARTAB | BLKDAT | 1565 /X2/ |
| | (165) | PARTAB | BLKDAT | 1628 /Y1/ |
| | (166) | PARTAB | BLKDAT | 1629 /Y2/ |
| | (167) | PARTAB | BLKDAT | 1692 /Z1/ |
| | (168) | PARTAB | BLKDAT | 1693 /Z2/ |
| | (169) | PARTAB | BLKDAT | 20675 /ECC/ |
| | (170) | PARTAB | BLKDAT | 66057 /PHI/ |
| | (171) | PARTAB | BLKDAT | 81991 /TAG/ |
| | (172) | PARTAB | BLKDAT | 1328278 /EDRV/ |
| | (173) | PARTAB | BLKDAT | 5471752964 /EFIELD/ |
| | (174) | PARTAB | BLKDAT | 1177 /RY/ |
| | (175) | PARTAB | BLKDAT | 5001683 /SEGS/ |
| | (176) | PARTAB | BLKDAT | 67662798 /DBGON/ |
| | (177) | PARTAB | BLKDAT | 337663233 /THETA/ |
| | (178) | PARTAB | BLKDAT | 340267205 /TRACE/ |
| | (179) | PARTAB | BLKDAT | 4330418566 /DBG0FF/ |
| | (180) | PARTAB | BLKDAT | 5772186885 /EXCITE/ |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|----------------------|
| | (181) | PARTAB | BLKDAT | 6463972100 /FARFLD/ |
| | (182) | PARTAB | BLKDAT | 7604027476 /GEODAT/ |
| | (183) | PARTAB | BLKDAT | 15121015556 /NERFLD/ |
| | (184) | PARTAB | BLKDAT | 28122550547 /ZLOADS/ |
| | (185) | PARTAB | BLKDAT | 595 /IS/ |
| | (186) | PARTAB | BLKDAT | 66964 /PIV/ |
| | (187) | PARTAB | BLKDAT | 215 /CW/ |
| | (188) | PARTAB | BLKDAT | 1239 /SW/ |
| | (189) | PARTAB | BLKDAT | 68690768 /ZMAT/ |
| | (190) | PARTAB | BLKDAT | 2167947860 /BANDIT/ |
| | (191) | PARTAB | BLKDAT | 581911 /BNDW/ |
| | (192) | PARTAB | BLKDAT | 5772186908 /EXCIT1/ |
| | (193) | PARTAB | BLKDAT | 5772186909 /EXCIT2/ |
| | (194) | PARTAB | BLKDAT | 19651368084 /RSTART/ |
| | (195) | PARTAB | BLKDAT | 5846147 /VSRC/ |
| | (196) | PARTAB | BLKDAT | 1389699 /ESRC/ |
| | (197) | PARTAB | BLKDAT | 4739140 /READ/ |
| | (198) | PARTAB | BLKDAT | 4243 /ABS/ |
| | (199) | PARTAB | BLKDAT | 390632709 /WRITE/ |
| | (200) | PARTAB | BLKDAT | 361043 /AXIS/ |
| | (201) | PARTAB | BLKDAT | 279 /DW/ |
| | (202) | PARTAB | BLKDAT | 5247443 /TAGS/ |
| | (203) | PARTAB | BLKDAT | 269 /DM/ |
| | (204) | PARTAB | BLKDAT | 4268803 /PRLC/ |
| | (205) | PARTAB | BLKDAT | 5055235 /SRLC/ |
| | (206) | PARTAB | BLKDAT | 274 /DR/ |
| | (207) | PARTAB | BLKDAT | 280 /DX/ |
| | (208) | PARTAB | BLKDAT | 276 /DT/ |
| | (209) | PARTAB | BLKDAT | 281 /DY/ |
| | (210) | PARTAB | BLKDAT | 272 /OP/ |
| | (211) | PARTAB | BLKDAT | 282 /DZ/ |
| | (212) | PARTAB | BLKDAT | 15388140108 /NUMFIL/ |
| | (213) | PARTAB | BLKDAT | 5280581 /TIME/ |
| | (214) | PARTAB | BLKDAT | 914 /NR/ |
| | (215) | PARTAB | BLKDAT | 324015379 /STATS/ |
| | (216) | PARTAB | BLKDAT | 4798029 /RSYM/ |
| | (217) | PARTAB | BLKDAT | 4273741 /PSYM/ |
| | (218) | PARTAB | BLKDAT | 1025 /PA/ |
| | (219) | PARTAB | BLKDAT | 1178 /RZ/ |
| | (220) | PARTAB | BLKDAT | 537733 /BCRE/ |
| | (221) | PARTAB | BLKDAT | 38021 /IRE/ |
| | (222) | PARTAB | BLKDAT | 66693 /PRE/ |
| | (223) | PARTAB | BLKDAT | 20490261396 /SETINT/ |
| | (224) | PARTAB | BLKDAT | 1042 /PR/ |
| | (225) | PARTAB | BLKDAT | 1028 /PD/ |
| | (226) | PARTAB | BLKDAT | 11 56 /RD/ |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|----------------|------------------|------------------|-----------------------|
| | (227) | PARTAB | BLKDAT | 1170 /RR/ |
| | (228) | PARTAB | BLKDAT | 1036 /PL/ |
| | (229) | PARTAB | BLKDAT | 338 /ER/ |
| | (230) | PARTAB | BLKDAT | 324 /ED/ |
| | (231) | PARTAB | BLKDAT | 217 /CY/ |
| | (232) | PARTAB | BLKDAT BLKDAT | 1155 /RC/ 210 /CR/ |
| | (233) (234) | PARTAB PARTAB | BLKDAT | 196 /CD/ |
| | (235) | PARTAB | BLKDAT | 259 /DC/ |
| | (236) | PARTAB | BLKDAT | 1027 /PC/ |
| | (237) | PARTAB | BLKDAT | 29956 /GTD/ |
| | (238) | PARTAB | BLKDAT | 845 /MM/ |
| | (239) | PARTAB | BLKDAT | 341 /EU/ |
| | (240) | PARTAB | BLKDAT | 339 /ES/ |
| | (241) | PARTAB | BLKDAT | 329 /EI/ |
| | (242) | PARTAB | BLKDAT | 323 /EC/ |
| | (243) | PARTAB | BLKDAT | 65810 /PDR/ |
| | (244) | PARTAB | BLKDAT | 6644879444 /FLDMAT/ |
| | (245) | PARTAB | BLKDAT | 9984545047 /ISHADW/ |
| | (246) | PARTAB | BLKDAT | 14211437317 /MODULE/ |
| | (247–250) | PARTAB | BLKDAT | 4*0 |
| NCOL | | SCNPAR | BLKDAT | 1 |
| NCOM | | SCNPAR | BLKDAT | 1 |
| NCOMCH | | SCNPAR | BLKDAT | \$ |
| NCOPPA | | SCNPAR | BLKDAT | 4 |
| NCON | | SCNPAR | BLKDAT | 1 |
| NCONCH | | SCNPAR | BLKDAT | * |
| NCON1 | | SCNPAR | BLKDAT | 2 |
| NCOX | | JUNCOM | | |
| NCOZ | | JUNCOM | | |
| NOATBL | (1-480) | PARTAB | BLKDAT | 0 |
| NOATMX | | PARTAB | BLKDAT | 60 |
| NOEBUF | | DEFDAT | BLKDAT | 0 |
| NOEBUG | | SCNPAR | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|----------|-----------|-------|--|
| NOFILE | (1-99) | IOF LE . | BLKDAT | 0 | |
| NDIG | | SCNPAR | BLKDAT | 0 | |
| NDIGIT | | SCNPAR | BLKDAT | 2 | |
| NDTASK | | SCHPAR | BLKDAT | 10 | |
| NDXBLK | | SEGMNT | | | |
| NENDCD | | SCNPAR | BLKDAT | \$ | |
| NEOFLG | | SCNPAR | BLKDAT | 0 | |
| NERCL1 | | INPERR | BLKDAT | 1 | |
| NERCOD | | INPERR | BLKDAT | 2 | |
| NERCON | | INPERR | BLKDAT | 3 | |
| NERDPN | | INPERR | BLKDAT | 4 | |
| NEREOF | | INPERR | BLKDAT | 5 | |
| NEREXD | | INPERR | BLKDAT | 6 | |
| NEREXF | | INPERR | BLKDAT | 7 | |
| NEREXP | | INPERR | BLKDAT | 8 | |
| NERINT | | INPERR | BLKDAT | 9 | |
| NERNAM | | INPERR | BLKDAT | 10 | |
| NF | (1-10) | SCNPAR | | | |
| NFILES | | IOFLES | BLKDAT | 99 | |
| NFINCD | | SCNPAR | BLKDAT | 0 | |
| NFRAC | | SCNPAR | BLKDAT | 0 | |
| NILEGL | | INPERR | BLKDAT | 11 | |
| NINT | | SCNPAR | BLKDAT | 1 | |
| NLETR | | SCNPAR | BLKDAT | 1 | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|--------|--|
| NLOOPS | (1-400) | PARTAB | BLKDAT | 0 | |
| NMNAMS | (1-50) | ADEBUG | BLKDAT | 0 | |
| NMSPTR | | ADEBUG | BLKDAT | 1 | |
| NMTIMS | (1-50) | ADEBUG | BLKDAT | 0 | |
| NOEND | | INPERR | BLKDAT | 12 | |
| NOGOFG | | ADEBUG | BLKDAT | 0 | |
| NOMTCH | | SCNPAR | | | |
| NOPCOD | | ADEBUG | BLKDAT | -99999 | |
| NOSTAT | | ADEBUG | BLKDAT | .TRUE. | |
| NOTASK | | INPERR | BLKDAT | 13 | |
| NPAREN | | SCNPAR | BLKDAT | 5 | |
| NPARGL | | PARTAB | | | |
| NPATCH | | SEGMNT | BLKDAT | 0 | |
| NPDATA | | PARTAB | | | |
| NPEARG | | INPERR | BLKDAT | 1 | |
| NPEDPC | | INPERR | BLKDAT | 2 | |
| NPEDPL | | INPERR | BLKDAT | 4 | |
| NPEDRM | | INPERR | BLKDAT | 3 | |
| NPEDUM | (1-27) | INPERR | | | |
| NPEIFO | | INPERR | BLKDAT | 21 | |
| NPEKWO | | INPERR | BLKDAT | 18 | |
| NPELA8 | | INPERR | BLKDAT | 5 | |
| NPELIT | | INPERR | BLKDAT | 6 | |
| NPELNF | | INPERR | | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|-------|--|
| NPELNL | | INPERR | BLKDAT | 7 | |
| NPELOO | | INPERR | BLKDAT | 8 | |
| NPELOP | | INPERR | BLKDAT | 9 | |
| NPELST | | INPERR | BLKDAT | 20 | |
| NPENOI | | INPERR | BLKDAT | 10 | |
| NPENOM | | INPERR | BLKDAT | 11 | |
| NPENRG | | INPERR | BLKDAT | 12 | |
| NPENTK | | INPERR | BLKDAT | 13 | |
| NPENUM | | INPERR | BLKDAT | 14 | |
| NPERGE | | INPERR | BLKDAT | 19 | |
| NPEROD | | SCNPAR | BLKDAT | 7 | |
| NPESCN | | INPERR | BLKDAT | 22 | |
| NPESEX | | INPERR | BLKDAT | 15 | |
| NPESYM | | INPERR | BLKDAT | 16 | |
| NPETSK | | INPERR | BLKDAT | 17 | |
| NPLITN | | PARTAB | | | |
| NPLOOP | | PARTAB | | | |
| NPRDEF | | DEFDAT | BLKDAT | 5 | |
| NPRPT | | PNTTBL | BLKDAT | 4 | |
| NPRSEG | | SEGMNT | BLKDAT | 11 | |
| NPRSER | | SCNPAR | BLKDAT | 0 | |
| NPTASK | | PARTAB | | | |
| NPTBUF | | PNTTBL | BLKDAT | 0 | |
| MRAD | | SEGMNT | | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|-------|
| NRDCDF | | SCNPAR | | |
| NRESTF | | SCNPAR | | |
| NRNAMS | (1-200) | ADEBUG | BLKDAT | 0 |
| NRSUBS | | ADEBUG | BLKDAT | 190 |
| NRTIMS | (1-200) | ADEBUG | BLKDAT | 0 |
| NSCNER | | SCNPAR | BLKDAT | 0 |
| NSCOL | | SCNPAR | | |
| NSEG | | FLDCOM | | |
| NSHFTS | | ADEBUG | BLKDAT | 1000 |
| NTAB | | SCNPAR | BLKDAT | 1 |
| NTALPH | | ADEBUG | 8LKDAT | 6 |
| NTASK | | SCNPAR | BLKDAT | 0 |
| NTASKS | | PARTAB | BLKDAT | 47 |
| NTDM | | PARTAB | BLKDAT | 44 |
| NTDPF1 | | ADEBUG | BLKDAT | 9 |
| NTDPF2 | | ADEBUG | BLKDAT | 10 |
| NTEMPS | | TEMPO1 | BLKDAT | 5500 |
| NTENO | | ADEBUG | BLKDAT | 1 |
| NTERR | | ADEBUG | BLKDAT | 2 |
| NTFLPT | | ADEBUG | BLKDAT | 8 |
| NTINT | | ADEBUG | BLKDAT | 7 |
| NTKEYW | | ADEBUG | BLKDAT | 5 |
| NTPGTD | | GTDOAT | BLKDAT | 3 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|----------------------------------|
| NTSFMT | (1-5) | PARTAB | BLKDAT | 4,2,-2,-1,-2 |
| | (6-10) | PARTA3 | BLKDAT | 4,3,-1,-2,41 |
| | (11-14) | PARTAB | BLKDAT | 0 |
| | (15-20) | PARTA3 | BLKDAT | 4,5,60,44,117,0 |
| | (21-25) | PARTAB | BLKDAT | 0,0,0,0 |
| | (26-29) | PARTAB | BLKDAT | 3,7,-1,-2 |
| | (30–34) | PARTAB | BLKDAT | 4,8,21568,16246,-17 |
| | (35–39) | PARTAB | BLKDAT | 4,9,-1,-2,65 |
| | (40–41) | PARTAB | BLKDAT | 1,10 |
| | (42-47) | PARTAB | BLKDAT | 0,0,0,0,0 |
| | (48–52) | PARTAB | BLKDAT | 9,13,-2,60,51 |
| | (53–57) | PARTAB | BLKOAT | 85,72,47,73,48 |
| | (58–61) | PARTAB | BLKDAT | 0,0,0,0 |
| | (62–66) | PARTAB | BLKDAT | 9,15,-2,-1,-2 |
| | (67-71) | PARTAB | BLKDAT | -2,-1,-6,17,18 |
| | (72–74) | PARTAB | BLKDAT | 2,16,-15 |
| | (75–77) | PARTAB | BLKDAT | 2,17,-14 |
| | (78-81) | PARTAB | BLKDAT | 3,19,-1,-2 |
| | (82-86) | PARTAB | BLKDAT | 8,21,-2, 60,51 |
| | (87-90) | PARTAB | BLKDAT | 72,47,73,48 |
| | (91-95) | PARTAB | BLKDAT | 4,38,-1,60,-9 |
| | (96-98) | PARTAB | BLKDAT | 0,0,0 |
| | (99-102) | PARTAB | BLKDAT | 0 |
| | (103–106) | PARTAB | BLKDAT | 2,24,-11,0 |
| | (107-110) | PARTAB | BLKDAT | 2,25,-11,0 |
| | (111–115) | PARTAB | BLKDAT | 0 |
| | (116-121) | PARTAB | BLKDAT | 0 |
| | (122-126) | PARTAB | BLKDAT | 0 |
| | (127–131) | PARTAB | BLKDAT | 0,0,0,0,0 |
| | (132–136) | PARTAB | BLKDAT | 4,29,60,144,45 |
| | (137–142) | PARTAB | BLKDAT | 7,30,-16,-165,72,47 |
| | (143–149) | PARTAB | BLKDAT | 73,48,0,4,31,-2,-1 |
| | (150-156) | PARTAB | BLKDAT | -2,6,32,-1,85,77,70 |
| | (157-161) | PARTAB | BLKDAT | 42,3,33,-1,-2 |
| | (162-165) | PARTAB | BLKDAT | 2,34,-10,0 |
| | (166–169) | PARTAB | BLKDAT | 2,35,-6,-11 |
| | (170–173) | PARTAB | BLKDAT | 0,0,0,0 |
| | (174–178) | PARTAB | BLKDAT | 8,39,6645351,14,52 |
| | (179-182) | PARTAB | BLKDAT | 104,105,106,107 7,45,-1,-2,52 |
| | (183–187) | PARTAB | BLKDAT | 88,10572,-10,10,46 |
| | (188-192) | PARTAB | BLKDAT | -12.52.442769,-165 |
| | (193-197) | PARTAB | BLKDAT | 70,83,66,50 |
| | (198-201) | PARTAB | BLKDAT | 23,43,-1,-2,3815483 |
| | (202-206) | PARTAB | BLKDAT | 35530819,-5,-9,-5 |
| | (207-211) | PARTAB | BLKDAT | -9, -5, -9, -5, -9 |
| | (212-216) | PARTAB | BLKDAT | -3,-3,-3,-3 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|------------------------|------------------|------------------|--------------------------------|
| | (217-221) | PARTAB | BLKDAT | -5,-9,-5,-9,-5 |
| | (222-225) | PARTAB | BLKDAT | -9595 |
| | (226-230) | PARTAB | BLKDAT | 11.421.14.52 |
| | (231–235) (236–237) | PARTAB | BLKDAT | 27999,26732,-5,-5,-5 |
| | (238-239) | PARTAB PARTAB | BLKDAT | 21068,-10 |
| | (240-242) | PARTAB | BLKDAT BLKDAT | 0 |
| | (243-247) | PARTAB | BLKDAT | 2,47,-13 9,23,-1,3553594,47 |
| | (248-252) | PARTAB | BLKDAT | 48,72,73,10572,-10 |
| | (253–300) | PARTAB | BLKDAT | 0 |
| NTSKMX | | PARTAB | BLKDAT | 100 |
| NTSKTB | (1-100) | PARTAB | BLKDAT | 0 |
| NTSYMB | | ADEBUG | BLKDAT | 4 |
| NTTASK | | ADEBUG | BLKDAT | 3 |
| NU | (1-3) | FLDVAL | | |
| NUMARG | | ARGCOM | BLKDAT | 0 |
| NUMCHK | | SYSFIL | BLKDAT | 0 |
| NUMCYL | | GTDDAT | BLKDAT | 0 |
| NUMECP | | GTDDAT | BLKDAT | 0 |
| NUMGTD | | GTDDAT | BLKDAT | 0 |
| NUMPLT | | GTDDAT | BLKDAT | 0 |
| NUMPTS | | PNTTBL | BLKDAT | 0 |
| NUMSEG | | SEGMNT | BLKDAT | 0 |
| NUMNIP | | PARTAB | BLKDAT | 34 |
| NUMBERD | | ADEBUG | | |
| NVAL | (1-256) | SCNPAR | BLKDAT | 0 |
| NVALHX | | SCNPAR | BLKDAT | 256 |
| NHOSIZ | | ADEBUG | BLKDAT | 36 |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|--------------------|
| NWIRE | | SEGMNT | BLKDAT | 0 |
| NWLKOV | | ADEBUG | | |
| NXTSYM | | SYMSTR | BLKDAT | 1 |
| NXTTSK | | ADEBUG | | |
| NYRSYM | | SEGMNT | | |
| PAREA | | SEGMNT | | |
| POCR | (1-168) | BNDDCL | | |
| PHSR | | DIR | | |
| PHWR | (1-84) | BRNPHW | | |
| PI | | PIS | BLKDAT | 3.14159265 |
| PRAD | | OUTPTD | | |
| PTTBLE | (1-400) | PNTTRL | | EQUIVALENCE IPTTBL |
| PX | | AMPZIJ | | |
| PY | | AMPZIJ | | |
| RAD | (1-10) | SEGMNT | BLKDAT | 0 |
| RANG | | OUTPTD | | |
| REFH | | AMPZIJ | | |
| REFV | | AMPZIJ | | |
| RG | | FUDG | | |
| RGII | | FUGDI | | |
| RGJ | | FUDGJ | | |
| RHK | | TMI | | |
| RHO1 | | FUDG | | |
| RH01I | | FUDGI | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|--------------------|
| RH01J | | FUDGJ | | |
| RHOX | | AMPZIJ | | |
| RHOY | | AMPZIJ | | |
| RHOZ | | AMPZIJ | | |
| RKB2 | | TIM | | |
| ROX | | CSYSTM | | |
| ROY | | CSYSTM | | |
| ROZ | | CSYSTM | | |
| RPD | | PIS | BLKDAT | 0.0174532925 |
| RSTART | | SYSFIL | BLKDAT | .FALSE. |
| RSTRTA | | SYSFIL | BLKDAT | .FALSE. |
| RSUMS | (1-200) | ADEBUG | BLKDAT | 0 |
| RTINS | (1-200) | ADEBUG | BLKDAT | 0 |
| S | | AMPZIJ | | |
| SABI | | AMPZIJ | | |
| SABJ | | AMPZIJ | | |
| SALPI | | AMPZIJ | | |
| SALPJ | | AMPZIJ | | |
| SALPR | | AMPZIJ | | |
| SAS | | GTD | | |
| SASP | | GTD | | |
| SCALE | | SEGMNT | BLKDAT | 1 |
| SCALES | (1,2,3) | GEODAT | BLKDAT | .3048,.0254,100 |
| SEGTBL | (1-5500) | SEGMNT | | EQUIVALENCE ISGTBL |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|---------------------|
| SIGMA | | AMPŽIČ | BLKDAT | 0.0 |
| SMAG | | FUDG | | |
| SMAGI | | FUDGI | | |
| SMAGJ | | FUDGJ | | |
| SNC | (1-2) | GEOMEL | | |
| SNFF | | DIST | | |
| SORT | | GEODAT | | |
| SP1 | | SRC | | |
| SP2 | | SRC | | |
| SPS | | DIR | | |
| STHS | | DIR | | |
| SYSLST | (1-20) | SYSFIL | | EQUIVALENCE LSTSYS |
| TDCR | (1-168) | BNDDCL | | |
| TEMP | (1-5500) | TEMP01 | | EQUIVALENCE ITEMP |
| THSR | | DIR | | |
| THTN | | CYLIN | | |
| ТНТР | | CYLIN | | |
| TIMTGO | | SYSFIL | BLKDAT | -1. |
| ТОР | | TOPD | BLKDAT | (70710678,.70710678 |
| TPCEPI | | AMPZIJ | BLKDAT | 59.958544 |
| TPI | | PIS | BLKDAT | 5.28318531 |
| TRO | (1-3) | XSTR1 | | |
| TRACST | | ADEBUG | | |
| TRAN | | FUDG | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|------------------|
| TRANI | | FUDGI | | |
| TRANJ | | FUDGJ | | |
| TSUMS | (1-50) | ADEBUG | BLKDAT | 0 |
| TTINS | (1-50) | ADEBUG | BLKDAT | 0 |
| TWOPI | | AMPZIJ | BLKDAT | 6.283185 |
| TIXI | | AMPZIJ | | |
| T1XJ | | AMPZIJ | | |
| T1YI | | AMPZIJ | | |
| T1YJ | | AMPZIJ | | |
| T1ZI | | AMPZIJ | | |
| T1ZJ | | AMPZIJ | | |
| T2XI | | AMPZIJ | | |
| T2XJ | | AMPZIJ | | |
| T2YI | | AMPZIJ | | |
| T2YJ | | AMPZIJ | | |
| T2ZI | | AMPZIJ | | |
| T2ZJ | | AMPZIJ | | |
| UCD | (1-84) | BNDRCL | | |
| UDC | (1-2) | BNDDCL | | |
| UPDBLK | | SEGMNT | BLKDAT | .TRUE. |
| U1 | (1-2) | FLDVAL | | |
| V | (1-252) | GEOPLA | | |
| VAL | (1-256) | SCNPAR | BLKDAT | EQUIVALENCE NVAL |
| VCD | (1-84) | BNDRCL | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE |
|----------|-------------|--------|-----------|--------------------|
| VDC | (1-84) | BNDOCL | | |
| VMAG | (1-84) | EDMAG | | |
| VN | (1-42) | GEOPLA | | |
| VP | (1-252) | GEOPLA | | |
| VTI | (1-28) | BNDICL | | |
| VTS | (1-2) | BNDSCL | | |
| VXI | (1-126) | IMAINF | | |
| VXIC | (1-18) | IMCINF | | |
| VXS | (1-9) | SORINF | | |
| vxss | (1-9) | XSTR1 | | |
| V1 | (1-2) | FLDVAL | • | |
| WAVLGH | | AMPZIJ | | |
| MUNVAW | | AMPZIJ | | |
| WL | | OUTPTD | | |
| WORDS | (1-20) | ADEBUG | | EQUIVALENCE IWORDS |
| W1 | (1-2) | FLDVAL | | |
| X | | FLDVAL | | |
| X | (1-252) | GEOPLA | | |
| XCL | (1-3) | ROTRDT | | |
| XI | | AMPZIJ | | |
| XI | (1-588) | IMAINF | | |
| XIC | (1-6) | IMCINF | | |
| XPC | (1-3) | PATDAT | | |
| ХJ | | AMPZIJ | | |

| VARIABLE | (SUBSCRIPT) | COMMON | WHERE SET | VALUE | |
|----------|-------------|--------|-----------|-------|--|
| XR | (1-3) | FUDG | | | |
| XRI | (1-3) | FUDGI | | | |
| XRJ | (1-3) | FUDGJ | | | |
| XS | (1-3) | SORINF | | | |
| xss | (1-3) | XSTR1 | | | |
| XX | (1-252) | PLAIN | | | |
| Y | | FLDVAL | | | |
| YCL | (1-3) | ROTRDT | | | |
| YI | | AMPZIJ | | | |
| YPC | (1-3) | PATDAT | | | |
| YJ | | AMPZIJ | | | |
| Z | | FLDVAL | | | |
| ZC | (1-2) | GEOMEL | | | |
| ZCL | (1-3) | ROTRDT | | | |
| ZCN | | CYLIN | | | |
| ZCP | | CYLIN | | | |
| ZERO | | ADEBUG | BLKDAT | 1.E-7 | |
| ZI | | AMPZIJ | | | |
| ZJ | | AMPZIJ | | | |
| ZPC | (1-3) | PATDAT | | | |
| ZPK | | TMI | | | |
| ZRATI | | AMPZIJ | | | |

COMMON BLOCK/SUBROUTINE LOCATION INDEX GTD MODULE

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COMMON BLOCK/SUBROUTINE LOCATION INDEX MOM MODULE

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COMMON BLOCK/SUBROUTINE LOCATION INDEX MOM MODULE (CONCLUDED)

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COMMON BLOCK/SUBROUTINE LOCATION INDEX OUTPUT MODULE

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| SCALE2 | • | | | | · · · · | | | | | | | | | | | | | | | | SCALE2 |
| SCALE3 | • | | | | | | | | | 1 | | | | | | | | | | | SCALE3 |
| SET | • | | • | | | | • | | • | | | | | | | | | | | | SET |
| SHELL | • | | | f | | | | | | | | | | | | | | | | | SHELL |
| STATEN | • | | | | П | | | | | | | | • | | | | | | • | | STATEN |
| STATIN | • | | | | | | | | | | | | | | | | | | | | STATIN |
| STATOT | • | | | | Т | | | | | | | | | | | | | | | | STATOT |
| STRTUP | • | • | | | | | | | • | • | • | | • | • | | • | • | | • | | STRTUP |
| SYMDEF | • | | • | | | | | | | | • | | | • | | | | • | • | • | SYMDEF |
| SYMUPD | • | | | Γ | | | | | | | • | | | • | | | | | | | SYMUPD |
| SYSCHK | • | | | | | | | | | | T | | | | | | | | • | | SYSCHK |
| SYSRTN | • | | | | | | | | | | | | | | | | | | | | SYSRTN |
| TICHEK | | | | | | | | | 1 | İ | Г | | | Γ | | | | | | | TICHEK |
| TRCEBK | • | | | | | | | | Ì | 1 | | | | | | | | | • | | TRCEBK |
| TSKXQT | • | | • | T | | | | | <u> </u> | | Т | | | • | | • | • | | • | | TSKXQT |
| WLKBCK | • | | | | | \vdash | \vdash | | | | | | | <u> </u> | | | | | • | | WLKBCK |
| WRTCHK | • | | | 1 | — | _ | | | | | • | | • | • | | | • | | • | • | WRTCHK |
| WRIFIL | • | | | | | | | | | | • | | | | | | | | • | | WRTFIL |
| ZZXDUM | • | | • | | | | | | | | | | | • | | | | | | | ZZXDUM |

```
COMMON /ADEBUG/ ISON, ISOFF, LTRACE
     A , LROUTN, LCALLR, LSTAT, LRTNUM, LCALNM, NRSUBS, NRNAMS(200)
     B ,NRTIMS(200), RTINS(200), RSUMS(200)
     C ,NMSPTR, NMNAMS(50), NMTIMS(50), TTINS(50), TSUMS(50)
     D , NAMRTN (28), INDXWB, MXWALK, NWLKOV
     E ,MXSUBS, NSHFTS, ITASK, NXTTSK, IERRF
       , ICALL , ISUBR, NUMWRD, WORDS (20), LSTIOD
     G ,LUTASK, LUPRNT, LUDBÚG
H ,NOPCOD, ZERO
     I , NTEND, NTERR, NTTASK, NTSYMB, NTKEYW, NTALPH, NTINT
     J ,NTFLPT, NTDPF1, NTDPF2
     K ,MACHIN, NWDSIZ, NBYTSZ, NBYTES, MANTSA, LB L ,IRSTRT, IWRTCK, IMDCHK, DBGPRT, NOGOFG
         , NOSTAT, TRACST, IDUMMY (9)
C
      DIMENSION IWORDS(20)
      EQUIVALENCE (WORDS(1), IWORDS(1))
      LOGICAL DBGPRT
      LOGICAL NOSTAT
      LOGICAL TRACST
      DIMENSION LSAVE(5)
SYMBOL
                           DEFINITION
DBGPRT
                           Logical flag for printing debug output
                           Debug locator within a subroutine
ICALL
IDUMMY
                           Spare locations
IERRF
                           Integer error flag
IMDCHK
                           Flag indicating an end-of-module checkpoint is
                           being written
                           Index to the walk-back table
INDXWB
IRSTRT
                           Flag for a current restart
                           Integer = 0
ISOFF
ISON
                           Integer = 1
ISUBR
                           Integer defining subroutine and statement o
                           output call
                           Index to the task table
ITASK
```

COMDECK ADEBUG

ADEBUG

SYMBOL DEFINITION

IWORDS Output message storage locations

IWRTCK Flag to indicate when a checkpoint is being

written

LB Left justified blank field for CDC machines

LCALLR Called routine name

LCALNM Called routine number

LROUTN Calling routine name

LRTNUM Calling routine number

LSAVE Storage area for saving statistic information

LSTAT Status word used in tracing information

LSTION Maximum number of entries in IWORDS

LTRACE Trace word = ISON for tracing operation

= ISOFF for normal operation

LUDBUG Logical unit for debug printout

LUPRNT Logical unit for printout

LUTASK Logical unit for reading task

MACHIN Machine identification

MANTSA Number of bits in the mantissa of a floating

point word

MXSUBS Size of the NRNAMS array

MXWALK The size of the walk-back array

NAMRTN Array of subroutine names for walk-back

information

NBYTES The number of bytes per computer word

NBYTSZ The number of bits per byte

NMNAMS Array containing subroutine number

ADEBUG

| SYMBOL | DEFINITION |
|--------|--|
| NMSPTR | Number of subroutine pointer |
| NMTIMS | Array containing number of times each subroutine is entered |
| NOGOFG | Error flag |
| NOPCOD | A large negative number to indicate nothing in table entry |
| NOSTAT | Logical .TRUE. when no timing statistics are to be compiled |
| NRNAMS | Array containing the subroutine names |
| NRSUBS | The actual number of subroutine names loaded in the NRNAMS array |
| NRTIMS | Array containing the number of times subroutine is called |
| NSHFTS | Integer value 1000 used in the output call to pack the call number and the subroutine number in one word |
| NTALPH | Identifier of an alpha field or character |
| NTDPF1 | Identifier of the first part of a double precision floating point number |
| NTDPF2 | Identifier of the second part of a double precision floating point number |
| NTEND | Identifier of the end or last field of an input card |
| NTERR | Identifier of an error condition in a field on an input card |
| NTFLPT | Identifier of a floating point field |
| NTINT | Identifier of an integer field |
| NTKEYW | Identifier of a keyword field |
| NTSYMB | Identifier of a symbol field |

ADEBUG

| SYMBOL | DEFINITION |
|--------|------------|
| | |

NTTASK Identifier of a task field

NUMWRD Number of words to be transferred in an output

call

NWDSIZ Number of bits per a computer word

NWLKOV Not used

NXTTSK Pointer to the next task in the task table

RSUMS Accumulate the time in each subroutine

RTINS The time a subroutine was called

TRACST Logical .TRUE. when the debug trace is in effect

TSUMS Unused

TTINS Total time spent in each subroutine

WORDS Equivalence to symbol IWORDS for floating point

output

ZERO This is the round off error

COMDECK AMPZIJ

COMMON/ AMPZIJ / S,B,XI,YI,ZI,SABI,CABI,SALPI,XJ,YJ,ZJ,CABJ,SABJ,

A SALPJ, JCO1, JCO2, DIL, DIK, RHOX, RHOY, RHOZ, SALPR, REFV,

B REFH, ZRATI, KSYMP, IPERF, SIGMA, EPSR, FROMHZ, WAVLGH, TWOPI,

C ETA, TPCEPI, CLITE, FJ, PX, PY, ICO1, ICO2,

D T1XI, T1YI, T1ZI, T2XI, T2YI, T2ZI,

E T1XJ,T1YJ,T1ZJ,T2XJ,T2YJ,T2ZJ,AREA,

F EXRT1, EXIT1, EYRT1, EYIT1, EZRT1, EZIT),

G EXRT2, EXIT2, EYRT2, EYIT2, EZRT2, EZIT2,

Z WAVNUM, LSTAMP

COMPLEX ZRATI, FJ, REFV, REFH

Common AMPZIJ contains data and variables used for generating interaction matrix and field data.

| SYMBOL | DEFINITION |
|--|--|
| AREA | Surface area of a patch |
| В | Segment radius |
| CABI | U _X for i th segment |
| CABJ | U _X for j th segment |
| CLITE | Speed of light |
| DIK | δ _{ik} |
| DIL | δ _{il} |
| EPSR | Relative permittivity |
| ETA | Free space impedance |
| EXIT1, EXRT1 EYIT1, EYRT1 EZIT1, EZRT1 | Real and imaginary field components due to current in $\hat{\tau}_1$ direction on source patch |
| EXIT2, EXRT2 EYIT2, EYRT2 EZIT2, EZRT2 | Real and imaginary field components due to current in \hat{t}_2 direction on source patch |
| FJ | j |
| FRQMHZ | Frequency in megahertz |
| ICO1 | Connection data for end 1 of observation segment |

AMPZIJ

| <u>SYMBOL</u> | DEFINITION |
|----------------|--|
| ICO2 | Connection data for end 2 of observation segment |
| IPERF | > 0 implies perfect ground |
| JC01 | Connection data for end 1 of source segment |
| JCO2 | Connection data for end 2 of source segment |
| KSYMP | Image flag |
| LSTAMP | Last cell of common block AMPZIJ |
| PX,PY | Components of unit vector perpendicular to plane of incidence in the reflection geometry |
| REFH | R_{\parallel} - R_{\parallel} (Fresnel reflection coefficients) |
| REFV | RII |
| RHOX,RHOY,RHOZ | X, Y, Z, components of $\hat{\rho}$ |
| S | The segment length |
| SABI | U_{γ} of the i th segment |
| SABJ | U_{γ} of the j th segment |
| SALPI | U _Z of the i th segment |
| SALPJ | U _Z of the j th segment |
| SALPR | Z component of 2 |
| SIGMA | Ground plane conductivity |
| TPCEPI | <u>1</u> 2πcε ₀ |
| TWOPI | 2π |
| T1XI,T1YI,T1ZI | Components of $\boldsymbol{\hat{t}}_1$ unit vector for observation patch |
| T1XJ,T1YJ,T1ZJ | Components of $\hat{\mathfrak{t}}_1$ unit vector for source patch |
| T2XI,T2YI,T2ZI | Components of $\boldsymbol{\hat{t}_2}$ unit vector of observation patch |

AMPZIJ

| T2XJ,T2YJ,T2ZJ | Components of \hat{t}_2 unit vector for source patch |
|----------------|--|
| WAVLGH | Wavelength |
| WAVNUM | 2π/WAVLGH |
| XI | X coordinate of observation segment |
| XJ | X coordinate of source segment |
| YI | Y coordinate of observation segment |
| YJ | Y coordinate of source segment |
| ZI | Z coordinate of observation segment |
| ZJ | Z coordinate of source segment |
| ZRATI | $(\frac{\varepsilon_1}{\varepsilon_2}) \ (1 - \frac{j\sigma}{\omega \varepsilon_2})$ |

COMDECK ANUM

COMMON/ANUM/ANUML, ANUMK

SYMBOL DEFINITION

Averaging factor used to compute A,B,C coeffi-ANUMK

cients when there is a multiple junction at end

2 of a wire segment

Averaging factor used to compute A,B,C coefficients when there is a multiple junction at end **ANUML**

1 of a wire segment

COMDECK ARGCOM

COMMON/ARGCOM/ MXARGS, NUMARG, FLTARG(100), IPASS, LSTARG DIMENSION INTARG(100) EQUIVALENCE (INTARG(1), FLTARG(1))

Common ARGCOM is used as the communication between the task execution processor and the module which executes the task. The argument list and the command language are loaded into the FLTARG array which is equivalent to the INTARG array. This permits floating point and integer values to be loaded in the same array.

| SYMBOL | DEFINITION | | | | | | | | |
|--------|---|--|--|--|--|--|--|--|--|
| FLTARG | Value of floating point arguments | | | | | | | | |
| INTARG | Value of integer arguments | | | | | | | | |
| IPASS | Integer value 1 on first pass, integer value 2 on second pass through task list | | | | | | | | |
| LSTARG | Last cell of ARGCOM common | | | | | | | | |
| MXARGS | Size of the FLTARG array | | | | | | | | |
| NUMARG | Number of arguments of the current task being executed | | | | | | | | |

COMDECK BNDDCL

COMMON /BNDDCL/ VDC(14,6), UDC(2), PDCR(14,6,2), TDCR(14,6,2) A ,DTDC(14,6), BTDC(14,6,4), DDC(14,6,2)

| SYMBOL | DEFINITION |
|--------|--|
| BTDC | This array contains variables defining the vectors having been diffracted by the corner of edge ME of plate MP furthest from the cylinder which are tangent to the cylinder. The two tangent vectors are given by: |
| | $T1=\hat{X}*BTDC(MP,ME,1)+\hat{Y}*BTDC(MP,ME,2)$ |
| | $T2=\hat{X}*BTDC(MP,ME,3)+\hat{Y}*BTDC(MP,ME,4)$ |
| DDC | This array contains the cosine of the starting reflected ray theta angle, where |
| | DDC(MP,ME,N)=COS(TDCR(MP,ME,N)) |
| DTDC | Dot product of unit vectors or rays diffracted by edge ME of plate MP and reflected by the preferred starting point of the cylinder |
| PDCR | This array contains angles PDCR(MP,ME,N) defining the phi component of the reflected ray direction of rays diffracted by edge ME of plate MP and then reflected at starting point N on the cylinder |
| TDCR | This array contains angles TDCR(MP,ME,N) defining the reflected ray theta component of ray directions for rays diffracted by edge ME of plate MP and then reflected at starting reflection point N on the cylinder |
| UDC | This array contains the linear value UDC(N) defining the z component of the starting reflection points on the cylinder axis. $UDC(1)$ is for the more positive z location and $UDC(2)$ is for the more negative z location |
| VDC | This array contains the elliptic angle VDC(MP,ME) defining the starting reflection point on the cylinder for a ray diffracted from edge ME of plate MP and then reflected by the cylinder |

COMDECK BNDFCL COMMON /BNDFCL/ BD(14,6,2)

DEFINITION

BD

This defines permissible theta diffraction angles for wedge diffraction. The permissible range for diffraction angle BO for a source ray diffracted by edge ME of plate MP is given by:

COS(B1) < COS(BØ) < COS(B2)

where BO is the angle the diffracted ray makes with the edge, and B1 and B2 are defined at the corners of the plate as

COS(B1)=BD(MP,ME,1) COS(B2)=BD(MP,ME,2)

COMDECK BNDICL

COMMON /BNDICL/ DTI(14), VTI(14,2), BTI(14,4)

| S | ٧ | M | R | N | ı |
|---|---|---|---|---|---|
| • | • | | u | v | = |

DEFINITION

BTI

This defines unit vectors of the two rays reflected by plate MP and tangent to the cylinder. The unit vector for the source ray reflected from plate MP tangent to tangent point 1 is given by:

 $T1=\hat{X}*BTI(MP,1)+\hat{Y}*BTI(MP,2)$

The unit vector for the source ray reflected plate MP tangent to tangent point 2 is given by:

 $T2=\hat{X}*BTI(MP,3)+\hat{Y}*BTI(MP,4)$

DTI

This is the dot product of the two rays reflected by plate MP which are tangent to the cylinder from the source image for reflection from plate MP:

DTI(MP)=T1·T2

VTI

This is an array of elliptical angles defining the two tangent points on the cylinder for rays which are reflected from plate MP and tangent to the cylinder. Tangent point N for ray reflected from plate MP is given by:

X=A*COS(VTI(MP,N))
Y=B*SIN(VTI(MP,N))

COMDECK BNDRCL

COMMON /BNDRCL/ VCD(14,6), UCD(14,6), BCD(14,6,2)

| SYMBOL | |
|--------|--|
|--------|--|

DEFINITION

BCD

This array contains the value BCD(MP,ME,N) that defines the permissible range of the beta diffraction angles for the ray that is reflected by the cylinder and diffracted by edge ME of plate MP. The permissible range for diffraction angle BO for this ray is given by:

COS(B1) < COS(B0) < COS(B2)

where BO is the angle the diffracted ray makes with the edge and angles B1 and B2 are defined at the corners of the plate as:

COS(B1)=BCD(MP,ME,1) COS(B2)=BCD(MP,ME,2)

UCD

This array contains the linear value UCD(MP,MC) that defines the z component of the reflection point for the ray that is reflected by the cylinder and hits corner MC of plate MP. The reflection point location is given by:

X=A*COS(VCD(MP,MC))
Y=B*COS(VCD(MP,MC))
Z=UDC(MP,MC)

VCD

This array contains the elliptic angle VCD(MP,MC) that defines the x,y components of the reflection point location for the ray which is reflected by the cylinder and hits corner MC of plate MP.

COMDECK BNDSCL

COMMON /BNDSCL/ DTS, VTS(2), BTS(4)

SYMBOL

DEFINITION

BTS

This defines unit vectors of the two source rays tangent to the cylinder. The unit vector for the source ray tangent to tangent point 1 is given by:

T1=X*BTS(1)+Y*BTS(2)

The unit vector for the source ray tangent to

tangent point 2 is given by:

 $T2=\hat{X}*BTS(3)+\hat{Y}*BTS(4)$

DTS

This is the dot product of the two source

vectors tangent to the cylinder:

DTS=T1·T2

VTS

VTS consists of two elliptical angles defining the two tangent points on the cylinder. Tangent

point N is given by:

X=A*COS(VTS(N))
Y=B*SIN(VTS(N))

COMDECK BRNPHW

COMMON /BRNPHW/ PHWR(14,6)

SYMBOL

DEFINITION

PHWR

Is the phi angle location of the center of edge ME of plate MP with respect to the cylinder

COMDECK BSCERR

COMMON /BSCERR/ IBSCER

SYMBOL

DEFINITION

IBSCER

A flag used to indicate if an error occurred in the GTD calculations (0 indicates no error, 1 indicates error occurred) COMDECK CLDRC

COMMON /CLDRC/ LDRC(14,6) LOGICAL LDRC

SYMBOL

DEFINITION

LDRC

Is an array of logical variables. LDRC(MP,ME) is set true if starting point data are available from previous pattern angle (for next pattern angle) when defining the reflection point on cylinder for a ray which is diffracted from edge ME of plate MP and then reflected by the cylinder

COMDECK CLRDC

COMMON /CLRDC/ LRDC(14,6) LOGICAL LRDC

SYMBOL

DEFINITION

LRDC

Is an array of logical variables. LRDC(MP,ME) is set true if starting point data are available from previous pattern angle (for next pattern angle) when defining the reflection point on cylinder for a ray which is reflected by the cylinder and then diffracted by edge ME of plate COMDECK CLRFC
COMMON /CLRFC/ LRFC
LOGICAL LRFC

SYMBOL

DEFINITION

LRFC

Is a logical variable which is set true if the starting point data are available from previous pattern angle (for next pattern angle) when defining the reflection point on the cylinder

COMDECK CLRFI

COMMON /CLRFI/ LRFI(14) LOGICAL LRFI

SYMBOL

DEFINITION

LRFI

Is an array of logical variables. LRFI(MP) is set true if starting point data are available from previous pattern angle (for next pattern angle) when defining reflection point on the cylinder for a ray reflected by plate MR and then reflected by the cylinder

COMDECK CLRFS
COMMON /CLRFS/ LRFS(14)
LOGICAL LRFS

SYMBOL

DEFINITION

LRFS

Is an array of logical variables. LRFS(MP) is set true if starting point data are available for the next pattern angle when defining the reflection point on a cylinder for a ray reflected by the cylinder and then reflected by plate MP.

COMDECK COMP

COMMON /COMP/ CJ, CPI4 COMPLEX CJ, CPI4

SYMBOL

DEFINITION

CJ

The imaginary constant, J = SQRT(-1)

CPI4

The complex constant, CEXP(-J*PI/4)

COMDECK CYLIN COMMON /CYLIN/ AA, BB, ZCN, THTN, ZCP, THTP

| SYMBOL | DEFINITION |
|--------|---|
| AA | The elliptical cylinder major axis radius in meters |
| ВВ | The elliptical cylinder minor axis radius in meters |
| THTN | The theta angle from the z axis to the end cap normal of the more negative end cap (measured in the $x-z$ plane) in radians |
| ТНТР | The theta angle from the z axis to the end cap normal of the more positive end cap (measured in the $x-z$ plane) in radians |
| ZCN | The distance between the center of the cylinder and the point at which the z axis pierces the more negative end cap in meters |
| ZCP | The distance between the center of the cylinder and the point at which the z axis pierces the more positive end cap in meters |

```
COMDECK CSYSTM

COMMON/CSYSTM/MAXCSY,IDCSYS(10),CX(10),CY(10),CZ(10),ROX(10),

ROY(10),ROZ(10)

Z,LSTCSY

DIMENSION CVAL(10,6)

EQUIVALENCE (CVAL(1,1),CX(1))
```

 ${f Common}$ CSYSTM is used in the geometry input processor to store coordinate system information.

| SYMBOL | DEFINITION |
|-------------|--|
| CVAL | Equivalence to the coordinate system parameter arrays in the common CSYSTM |
| CX | Contains the x coordinate of the origin of a coordinate system |
| CY | Contains the y coordinate of the origin of a coordinate system |
| CZ | Contains the z coordinate of the origin of a coordinate system |
| IDCSYS | Contains the coordinate system identification number |
| LSTCSY | Last value of common CSYSTM |
| MAXCSY | Maximum number of coordinate system entries allowed |
| ROX,ROY,ROZ | X, Y, Z components of \hat{k} |

COMDECK DEFOAT

COMMON/DEFDAT/ MAXDEF, NPRDEF, NAMDEF, IDEFIN(100,5), IDFINS, NDEBUF Z , LSTDEF

Common DEFDAT is used in the geometry processor to store the defined element table.

SYMBOL DEFINITION

IDEFIN Array containing the defined element parameters

(See NOTE)

IDFINS Number of defined entries in core

LSTDEF Last cell of common DEFDAT

MAXDEF Maximum number of defined elements that can be

stored in core

NAMDEF Not used

NDEBUF Not used

NPRDEF Number of parameters needed for each defined

element

NOTE:

| COLUMN | <u>PARAMETER</u> |
|--------|--------------------------------|
| 1 | Name |
| 2 | 1 st segment number |
| 3 | Last segment number |
| 4 | 1 st point number |
| 5 | Last point number |

COMDECK DIR

COMMON /DIR/ D(3), THSR, PHSR, SPS, CPS, STHS, CTHS

| SYMBOL | DEFINITION |
|--------|---|
| CPS | The cosine of PHSR |
| CTHS | The cosine of THSR |
| D | The unit vector of the propagation direction in (xyz) reference coordinate system components: |
| | $\widehat{D} = \widehat{X} * D(1) + \widehat{Y} * D(2) + \widehat{Z} * D(3)$ |
| PHSR | Phi angle defining propagation direction in spherical reference coordinate system (measured from x axis) in radians |
| SPS | The sine of PHSR |
| STHS | The sine of THSR |
| THSR | Theta angle defining propagation direction in spherical reference coordinate system (measured from z axis) in radians |

COMDECK DIST COMMON / DIST / SNFF

SYMBOL

DEFINITION

SNFF

Distance from the cylinder reflection point image imaged through plate MP to the near-field observation point for a cylinder-reflected, then plate-reflected field

COMDECK DOUBLE COMMON /DOUBLE/ IDD(361), IDG(14,6), IANG

| SYMBOL | DEFINITION |
|--------|---|
| IANG | This integer variable identifies the observation angle under consideration |
| IDD | This integer identifies which edge the first diffraction occurs from and which plate shadows it for a given pattern angle |
| IDG | This integer array is used to store the plate that shadows the ray diffracted from edge ME (ID(MP.ME)) |

COMDECK EDMAG

COMMON /EDMAG/ VMAG(14,6)

SYMBOL

DEFINITION

VMAG

This defines the length of edges on plates in wavelengths. The length of edge ME of plate MP is given by VMAG(MP,ME)

COMDECK EHFLD COMMON /EHFLD/ IEH

SYMBOL

DEFINITION

IEH

Integer flag to indicate the type of field wanted (1 for E-field, 0 for H-field)

COMDECK ESTOR
COMMON /ESTOR/ ETHT(361), EPHT(361)
COMPLEX ETHT, EPHT

SYMBOL

DEFINITION

EPHT

This complex array is used to store the total E-phi field

ETHT

This complex array is used to store the total E-theta field

COMDECK FARP COMMON /FARP/ IM, H, HAW

| SYMBOL | DEFINITION |
|--------|--|
| Н | The length of the source (in the direction of the source current) in wavelengths |
| HAW | The aperture width in wavelengths (width of the source) (if HAW is less than 0.1 wavelengths, the code assumes the source to be a line source) |
| IM | This defines the type of source used: IM=O specifies electric source IM=1 specifies magnetic source |

COMDECK FEDDAT

COMMON /FEDDAT/ EFED(361), HFED(361) COMPLEX EFED, HFED

SYMBOL **DEFINITION**

EFED This complex array defines the E-plane pattern of the source

HFED This complex array defines the H-plane pattern

of the source

```
COMDECK FINI

IF(NOSTAT) RETURN

CALL WLKBCK (NAMSUB)

CALL STATOT (NAMSUB, NUMSUB, LS /E(1))

LROUTN = LSAVE(1)

LCALLR = LSAVE(2)

LSTAT = LSAVE(3)

LRTNUM = LSAVE(4)

LCALNM = LSAVE(5)

RETURN
```

Common deck FINI is used to initiate a subroutine exit and restore all subroutine calling information.

| SYMBOL | DEFINITION |
|--------|--|
| LCALLR | Last calling routine name |
| LCALNM | Last calling routine number |
| LROUTN | Last routine name |
| LRTNUM | Last routine number |
| LSAVE | Internal array to restore statistical information |
| LSTAT | Last location in subroutine where set to before exit |
| NAMSUB | Current subroutine name |
| NUMSUB | Current subroutine number |

COMDECK FLDCOM

COMMON/ FLDCOM / LOCAIR, LOCAII, LOCBIR, LOCBII, LOCCIR, LOCCII 1, NSEG

Common FLDCOM contains the pointers to the A, B, and C matrices in the TEMP array.

SYMBOL DEFINITION

LOCAII Location of imaginary parts of A

LOCAIR Location of real parts of A

LOCBII Location of imaginary parts of B

LOCBIR Location of real parts of B

LOCCII Location of imaginary parts of C

LOCCIR Location of real parts of C

NSEG Number of segments

COMDECK FLDVAL

COMMON/FLDVAL/X,Y,Z,ISRCE,E(3),U1(2),V1(2),W1(2),NU(3),ICTYPE,L1,L2,
L3,NAMSRC,FARFLD

COMPLEX E
LOGICAL FARFLD

Common /FLDVAL/ transfers observation point data from FLDDRV to GETFLD and field excitations from GETFLD to FLDDRV.

SYMBOL DEFINITION

E X,Y, and Z components of excitation

FARFLD Far-field flag

ICTYPE Coordinate system type

ISRCE Source type

L1,L2,L3 Loop indices

NAMSRC Symbolic name of source data set

NU Order of coordinates

U1 Start and increment of first observation loop

V1 Start and increment of second observation loop

W1 Start and increment of third observation loop

X,Y,Z Coordinates of observation point

COMDECK FLDXYZ
COMMON /FLDXYZ/ FX, FY, FZ
COMPLEX FX, FY, FZ

| SYMBOL | DEFINITION |
|--------|---|
| FX | The x component accumulator for the total elec- tric field desired in volts/wavelength in or reference coordinate system |
| FY | The y component accumulator for the total electric field desired in volts/wavelength in the reference coordinate system |
| FZ | The z component accumulator for the total electric field desired in volts/wavelength in the reference coordinate system |

COMDECK FNANG

COMMON /FNANG/ FNP(14,6)

SYMBOL

DEFINITION

FNP

Wedge angle of edge ME of plate MP FNP(MP,ME)=(2*PI-WA)/PI, where WA is the inside angle of the wedge. It is renamed FN in the main program before calling diffraction subroutines NOTE: If two plates intersect, diffraction calculation is only calculated once, even though two different edges are involved.

COMDECK FUDG

XR

COMMON /FUDG/ TRAN, ESTH, ESPH, EHTH, EHPH, XR(3), RG, RHO1

A ,SMAG, LTRF COMPLEX TRAN, ESTH, ESPH, EHTH, EHPH

LOGICAL LTRF

| SYMBOL | DEFINITION |
|------------|---|
| ЕНТН,ЕНРН | Theta and phi components of hard component of field incident on cylinder reflection point |
| ESTH, ESPH | Theta and phi components of soft component of field incident on cylinder reflection point |
| LTRF | Set true if geometrical optics reflected field is not present |
| RG | Radius of curvature of cylinder at reflection point |
| RH01 | Ray spreading radius in plane of cylinder curvature at reflection point in RCS |
| SMAG | Distance from source to reflection point |
| TRAN | The spread factor and phase of the geometrical optics field |

 $\ensuremath{\mathsf{X}},\ensuremath{\mathsf{Y}},\ensuremath{\mathsf{Z}}$ components of the reflection point location in RCS

COMDECK FUDGI

COMMON /FUDGI/ TRANI, ESTHI, ESPHI, EHTHI, EHPHI, XRI(3)

A ,RGII, RHO1I, SMAGI, LTRFI

COMPLEX TRANI, ESTHI, ESPHI, EHTHI, EHPHI
LOGICAL LTRFI

| LUGICAL LIKEI | |
|---------------|---|
| SYMBOL | DEFINITION |
| ЕНРНІ | Phi component of hard component of field incident on cylinder reflection point after plate reflection |
| EHTHI | Theta component of hard component of field incident on cylinder reflection point after plate reflection |
| ESPHI | Phi component of soft component of the field incident on the cylinder reflection point after plate reflection |
| ESTHI | The theta component of the soft component of the field incident on cylinder reflection point after plate reflection |
| LTRFI | Set true if geometrical optics reflected field is not present. |
| RGII | Radius of curvature of cylinder at reflection point |
| RH01I | Ray spreading radius in plane of cylinder curva- ture at reflection point in RCS |
| SMAGI | Distance from the source image to the cylinder reflection point |
| TRANI | The spread factor and phase of the geometrical optics field |
| XRI | X,Y,Z components of the reflection point location in RCS |

COMDECK FUDGJ

COMMON /FUDGJ/ TRANJ, ESTHJ, ESPHJ, EHTHJ, EHPHJ, XRJ(3)
A ,RGJ, RHO1J, SMAGJ, LTRFJ
COMPLEX TRANJ, TSTHJ, ESPHJ, EHTHJ, EHPHJ
LOGICAL LTRFJ

| SYMBOL | DEFINITION |
|-------------|---|
| ЕНТНЈ,ЕНРНЈ | Theta and phi components of bard component of field incident on cylinder reflection point |
| ESTHJ,ESPHJ | Theta and phi components of soft component of field incident on cylinder reflection point |
| LTRFJ | Set true if geometrical optics reflected field is not present |
| RGJ | Radius of curvature of cylinder at reflection point |
| RH01J | Ray spreading radius in plane of cylinder curvature at reflection point in RCS |
| SMAGJ | Distance from source to reflection point |
| TRANJ | The spread factor and phase of the geometrical optics field |
| XRJ | X,Y,Z components of the reflection point location in RCS |

COMDECK GEODAT

COMMON/ GEODAT / ITYPPT, ITYPTG, ITYPDE, ITYPPL, IRFLC(3), IAXIS(3),

SCALES(3),

1 ISCALE(3), DGTORD, IP217, ISEQ(100), SORT

Z ,LSTGEO LOGICAL SORT

Common GEODAT contains various information used in the geometry processor.

SYMBOL DEFINITION

DGTORD Parameter to convert from degrees to radians.

IAXIS Parameter identifying coordinate axis.

IP217 Integer power 2¹⁷

IRFLC Identifier of reflection coordinate axis.

ISCALE Identifier of the scale parameter on the input

command

ISEQ Array containing the sequence in a renumber

command.

ITYPDE Mnemonic identifying defined elements.

ITYPPL Mnemonic identifying a plate element

ITYPPT Mnemonic identifying point element

ITYPTG Mnemonic identifying tag element

LSTGEO Last cell of common GEODAT

SCALES Numerical values of the permissible scales

SORT Flag set .TRUE. if a bubble sort is to be per-

formed, set due to renumbering or the presence

of both wires and patches

COMDECK GEOMEL COMMON /GEOMEL/ A, B, ZC(2), SNC(2), CNC(2), CTC(2)

| SYMBOL | DEFINITION |
|--------|---|
| A | Radius of elliptical cylinder along x axis of the cylinder in wavelengths |
| В | Radius of elliptical cylinder along y axis of the cylinder in wavelengths |
| CNC | This is the cosine of the angle between the z axis and the plane of end cap MC (angle measured in x-z plane) |
| СТС | This is the cotangent of the angle between the z axis and the plane of end cap MC (angle measured in x-z plane) |
| SNC | This is the sine of the angle between the z axis and the plane of end cap MC (angle measured in $x-z$ plane) |
| ZC | Point where end cap MC intersects z axis of reference coordinate system. The variable ZC(1) refers to the more positive end cap and ZC(2) refers to the more negative end cap |

COMDECK GEOPLA COMMON /GEOPLA/ X(14,6,3), V(14,6,3), VP(14,6,3), VN(14,3) A ,MEP(14), MPX

| SYMBOL | DEFINITION |
|--------|--|
| MEP | This integer array defines the number of edges (or corners) on plate MP |
| MPX | This integer defines the number of plates in the geometry (not including ground plate) |
| V | This defines the edge unit vector for each edge on each plate. The edge vector V of edge ME on plate MP is as follows: V=x*V(MP,ME,1)+y*V(MP,ME,2)+z*V(MP,ME,3) (NOTE that edge ME is between corners MC and MC+1 where MC=ME) |
| VN | This defines the unit normal for each plate in (XYZ) reference coordinate system components. The plate unit normal for plate MP is given as follows: VN=x*VN(MP,1)+y*VN(MP,2)+z*VN(MP,3) |
| VP | This defines the unit binormal for each edge on each plate in (XYZ) reference system components. The edge binormal for edge ME of plate MP is as follows: VP=x*VP(MP,ME,1)+y*VP(MP,ME,2)+z*VP(MP,ME,3) |
| X | This array defines corner locations for all of the plates in the (XYZ) reference coordinate system components in wavelengths. The location of corner MC on plate MP is as follows: $x=\hat{x}X(MP,MC,1)+\hat{y}X(MP,MC,2)+\hat{z}X(MP,MC,3)$ |

COMDECK GROUND

COMMON /GROUND/ LGRND, MPXR LOGICAL LGRND

SYMBOL DEFINITION

LGRND A logical variable used to indicate the presence

of an infinite ground plane

LGRND=T Indicates ground plane present LGRND=F Indicates ground plane not used

The maximum number of plates present (including the ground plane if one is used) **MPXR**

COMDECK GTD

COMMON /GTD/ AS, ID, SAS, SASP, CAS

| SYMBOL | DEFINITION |
|--------|------------|
| | |

AS PI minus THSR (THSR is the theta component of

the observation direction in reference coordinate system relative to the cylinder axis in

radians)

CAS The cosine of AS

ID Flag for function FCT

SAS The sine of AS

SASP The absolute value of the sine of (AS-PI/2)

COMDECK GTDDAT

COMMON/ GTDDAT / NTPGTD, IPLTAG, ICYTAG, IECTAG, MXPLAR, MXCYAR, \$MXECAR, NUMPLT, NUMCYL, NUMECP, NUMGTD, MAXPLT, MAXCYL, MAXECP DIMENSION ITAGID(3)
EQUIVALENCE (IPLTAG, ITAGID(1))

This common contains all information regarding the GTD geometries, except that which is contained in SEGTBL (/SEGMNT/)

| SYMBOL | DEFINITION |
|--------|---|
| ICYTAG | Cylinder tag identifier |
| IECTAG | End cap tag identifier |
| IPLTAG | Plate tag identifier |
| ITAGID | Equivalenced to IPLTAG, ICYTAG, and IECTAG |
| MAXCYL | Maximum number of cylinders allowed |
| MAXECP | Maximum number of end caps allowed |
| MAXPLT | Maximum number of plates allowed |
| MXCYAR | Maximum number of arguments on CY (cylinder) geometry command |
| MXECAR | Maximum number of arguments on EC (end cap) geometry command |
| MXPLAR | Maximum number of arguments on PL (plate) geometry command |
| NTPGTD | Number of different types of GTD geometries |
| NUMCYL | Number of cylinders in present geometry data set |
| NUMECP | Number of end caps in present geometry data set |
| NUMGTD | Total number of GTD entries in geometry data set |
| NUMPLT | Number of plates in present geometry data set |

COMDECK HITPLT
COMMON /HITPLT/ MPH

SYMBOL

DEFINITION

MPH

Used for identifying double diffraction for plates; the number of the plate which the ray hits first.

COMDECK IMAINF

COMMON /IMAINF/ XI(14,14,3), VXI(3,3,14)

SYMBOL

DEFINITION

VXI

This specifies single reflection source image coordinate system axes unit vectors in (XYZ) reference coordinate system components.

The image source coordinate system axes unit vectors for single reflection of source in plate MP are given by:

XP=x*VXI(1,1,MP)+y*VXI(1,2,MP)+z*VXI(1,3,MP)

YP=x*VXI(2,1,MP)+y*VXI(2,2,MP)+z*VXI(2,3,MP)

ZP=x*VXI(3,1,MP)+y*VXI(3,2,MP)+z*VXI(3,3,MP)

ΧI

This gives the source image locations in wavelengths for all single and double reflections from plates.

The source image location for a ray which is singly reflected from plate MP is given by:

X=XI(MP,MP,1)

Y=XI(MP,MP,2)

Z=XI(MP,MP,3)

The source image location for a doubly reflected ray which reflects off of plate MP and then plate MPP is given by:

X=XI(MP,MPP,1)

Y=XI(MP,MPP,2)

Z=XI(MP_MPP.3)

COMDECK INCINF

COMMON /IMCINF/ XIC(2,3), VXIC(3,3,2)

SYMBOL

DEFINITION

VXIC

This defines the source image coordinate system axes for reflection from end caps. The source image coordinate system axes unit vectors for a ray reflected from end cap MC are given in the RCS as follows:

XP=x*VXIC(1,1,MC)+y*VXIC(1,2,MC)+z*VXIC(1,3,MC)YP=x*VXIC(2,1,MC)+y*VXIC(2,2,MC)+z*VXIC(2,3,MC)ZP=x*VXIC(3,1,MC)+y*VXIC(3,2,MC)+z*VXIC(3,3,MC)

XIC

This gives the source image locations for single reflections from cylinder end caps. The source location for reflection from end cap MC is given in the reference coordinate system as:

X=XIC(MC,1)Y=XIC(MC,2) Z=XIC(MC,3)

```
COMDECK INIT

IF (NOSTAT) GO TO 9876

IF (NUMSUB .EQ. 0 ) CALL ASSIGN(NAMSUB, NUMSUB)

LSAVE(1) = LROUTN

LSAVE(2) = LCALLR

LSAVE(3) = LSTAT

LSAVE(4) = LRTNUM

LSAVE(5) = LCALNM

LCALLR = LROUTN

LCALNM = LRTNUM

LROUTN = NAMSUB

LRTNUM = NUMSUB

LSTAT = 0

CALL STATIN(NAMSUB, NUMSUB, LSAVE(1))

CALL WLKBCK (NAMSUB)

9876 CONTINUE
```

Common deck INIT is used to initialize a subroutine entry and save subroutine calling information.

| SYMBOL | DEFINITION |
|--------|--|
| LCALLR | Last calling routine name |
| LCALNM | Last calling routine number |
| LROUTN | Last routine name |
| LRTNUM | Last routine number |
| LSAVE | Internal array to save statistical information |
| LSTAT | Last position in a subroutine |
| NAMSUB | Current subroutine name |
| NUMSUB | Current subroutine |

COMDECK INPERR

NPEARG

COMMON /INPERR/ NPEARG, NPEDPC, NPEDRM, NPEDPL, NPELAB, NPELIT,
1NPELNL, NPELOO, NPELOP, NPENOI, NPENOM, NPENRG, NPENTK, NPENUM,

2 NPESEX, NPESYM, NPETSK, NPEKWD, NPERGÉ, NPELST, NPEIFÓ, NPESCN,

3 NERCL1, NERCOD, NERCON, NERDPN, NEREOF, NEREXD, NEREXF, 4 NEREXP, NERINT, NERNAM, NILEGL, NOEND, NOTASK, NPELNF,

5 NPEDUM(27)

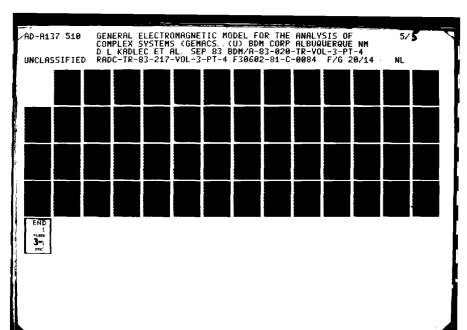
Common INPERR is used in the input language processor and contains the input error flags.

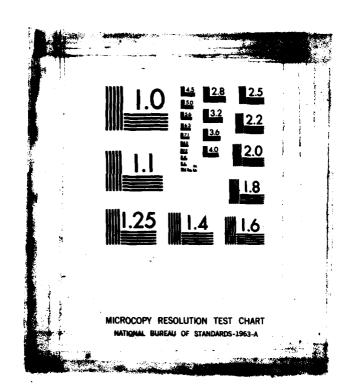
| SYMBOL | DEFINITION |
|--------|--|
| NERCL1 | Flag indicating no letter in column 1 of input card |
| NERCOD | Flag indicating scan code table is full |
| NERCON | Flag indicating improper continuation card |
| NERDPN | Flag indicating error detected by GETDPN (number field too large) |
| NEREOF | Flag indicating end of file before end of task (continuation expected) |
| NEREXD | Flag indicating exponent too large for double precision number |
| NEREXF | Flag indicating exponent too large for floating point number |
| NEREXP | Flag indicating no exponent found after E or D in number field |
| NERINT | Flag indicating scan error detected by GETINT (integer too large) |
| NERNAM | Flag indicating variable name is too long |
| NILEGL | Flag indicating illegal character detected by GETCHR |
| NOEND | Flag indicating no end of card character encountered |
| NOTASK | Flag indicating no legal task name was found |
| | |

Flag indicating argument table full

INPERR

| SYMBOL | DEFINITION |
|--------|---|
| NPEDPC | Flag indicating second half of a double precision number not found in the scan code table |
| NPEDPL | Flag indicating second half of a double precision number not found in the literal table |
| NPEDRM | Direct manipulation error |
| NPEDUM | Unused locations |
| NPEIFO | Left-over information in scan tables |
| NPEKWD | Flag indicating keyword expected but not found |
| NPELAB | Flag indicating unable to parse loop terminator label specification |
| NPELIT | Flag indicating literal number table is full |
| NPELNF | Flag indicating loop terminator label not found |
| NPELNL | Flag indicating lable number is not referenced by a loop instruction |
| NPELOO | Flag indicating loop table is full |
| NPELOP | Unable to recognize number of times to execute a loop |
| NPELST | Flag indicating illegal list item encountered |
| NPENOI | Flag indicating not enough information to fulfill command |
| NPENOM | Flag indicating no match found in symbol table when match was required |
| NPENRG | No argument passed to FNDARG |
| NPENTK | Task name not found |
| NPENUM | Flag indicating literal, either numeric or alpha, expected but not found |
| NPERGE | Array index out of range |





INPERR

| SYMBOL | DEFINITION |
|--------|---|
| NPESCN | Flag indicating scan error detected by parse |
| NPESEX | Flag indicating name already exists in symbol table |
| NPESYM | Flag indicating name symbol table is full |
| NPETSK | Flag indicating task table is full |

COMDECK INTMAT

COMMON/INTMAT/KJINT(18),KJGTD,KJMOM,KJFLD,ISETTB(22,5)
LOGICAL KJGTD,KJMOM,KJFLD

This common contains data on allowable physics interactions and interactions that have been set by the SETINT command.

| SYMBOL | DEFINITION |
|--------|--|
| ISETTB | Array of allowable physis interactions: keyword numbers and interaction numbers. |
| KJFLD | Flag set if any incident field interactions have been set |
| KJGTD | Flag set if any GTD interactions have been set |
| KJINT | Array of interactions set by SETINT command |
| KJMOM | Flag set if any MOM interactions have been set |

COMDECK IOFLES

COMMON / IOFLES /NFILES, IOFILE(99), NDFILE(99), LSTIOF

Common IOFLES controls the status and the position of the peripheral

files.

SYMBOL DEFINITION

IOFILE Array containing the current position pointer

for peripheral files.

Last cell of common IOFLES. **LSTIOF**

NDFILE Array containing the total number of words cur-

rently on a file.

NFILES

Integer value of the highest number logical unit which may be referenced. It is assumed that

logical units 8 through NFILES are available as

needed for symbol storage.

COMDECK JUNCOM

COMMON/JUNCOM/NCOX, JOX(50), NCIX, JIX(50), NCOZ, JOZ(50), NCIZ, JIZ(50) Z, MAXCON

Common JUNCOM is used by the interaction matrix generator and contains the junction information for wire gridded models.

| SYMBOL | DEFINITION |
|------------|--|
| JIX | Array containing numbers of the segments which have end 1 connected to end 1 of the source segment. |
| JIZ | Array containing the integer values of the segments which have end 2 connected to end 1 of the source segment. |
| JOX | Array containing the numbers of the segments which have end 1 connected to end 2 of the source segment. |
| J0Z | Array containing the identification of the segments which have end 2 connected to end 2 of the source segment. |
| MAXCON | Integer value of the maximum value of connections allowed on either end of the source segment. |
| NCIX | Integer value of the number of segments which have end 1 connected to end 1 of the source segment. |
| NCIZ | Integer value of the number of segments which have end 2 connected to end 1 of the source segment. |
| NCOX | Integer value of the number of segments which have end 1 connected to end 2 of the source segment. |
| NCOZ | Integer value of the number of segments which have end 2 connected to end 2 of the source segment. |

COMDECK LAST COMMON /LAST/ FRQGLA, IGDNLA

SYMBOL

DEFINITION

FRQGLA

The previous frequency used in GTD calculations

IGDNLA

The previous geometry data set name used in $\ensuremath{\mathsf{GTD}}$ calculations

COMDECK LDCBY
COMMON /LDCBY/ LDC(14,6)
LOGICAL LDC

SYMBOL

DEFINITION

LDC

Logical variable LDC (MP,ME) is set true if edge ME of plate MP is part of a diffracting wedge used to compute diffracted fields for plate-diffracted, cylinder-reflected ray

COMDECK LOGDIF

COMMON /LOGDIF/ LSLOPE, LCORNR LOGICAL LSLOPE, LCORNR

SYMBOL

DEFINITION

LCORNR

A logical variable used to indicate if corner

diffraction is desired.

LCORNR=T indicates corner diffraction desired LCORNR=F indicates corner diffraction not desired

LSLOPE

A logical variable used to indicate if slope

diffraction is desired.

LSLOPE=T indicates slope diffraction desired LSLOPE=F indicates slope diffraction not desired

COMDECK LPLCY

COMMON /LPLCY/ LPLA, LCYL LOGICAL LPLA, LCYL

SYMBOL

DEFINITION

LCYL

A logical variable used to indicate the presence

of an elliptic cylinder.

LCYL=T indicates cylinder present LCYL=F indicates cylinder not present

LPLA

A logical variable used to indicate the presence of at least one plate or infinite ground plate.

LPLA=T indicates plates are present

LPLA=F indicates plates not present

COMDECK LSHDP

COMMON /LSHOP/ LSTS, LSTD(14)
LOGICAL LSTS, LSTD

SYMBOL

DEFINITION

LSTD

A logical array such that LSTD(ML) is set true if plate ML totally shadows plate MP from the

source

LSTS

A logical variable set true if total shadowing algorithm is being used

COMDECK LSHDT

COMMON /LSHDT/ LSHD(14), LIHD(14,14) LOGICAL LSHD, LIHD

SYMBOL

DEFINITION

LIHD

A logical variable used to indicate if plates MP

and MPP cannot illuminate each other.

LIHD(MP, MPP)=T indicates plates cannot illumi-

nate each other

LIHD(MP, MPP)=F indicates plates can illuminate

each other

LSHD

A logical variable used to indicate if plate MP is totally shadowed from the source by any one plate or the cylinder. LSHD(MP)=T indicates plate MP is totally shadowed from direct source

rays.

LSHD(MP)=F indicates plate MP is not totally

shadowed

COMDECK MODULE

COMMON/MODULE/ MODNAM, MODLST(10), LSTMOD, MODMAX

This common block contains the name of the module executing and the names of modules which have previously executed.

| SYMBOL | DEFINITION |
|--------|---|
| LSTMOD | Pointer to last entry in MODLST |
| MODLST | List of modules which have already executed |
| MODMAX | Maximum length of MODLST |
| MODNAM | Name of module now executing |

COMDECK NEAR

COMMON /NEAR/ LNRFLD, FLDPT(3)

SYMBOL

DEFINITION

FLOPT

The near-field observation point in wavelengths

in the reference coordinate system

LNRFLD

A flag to indicate if far-field calculations

(LNRFLD=0) were requested or if near-field cal-

culations (LNRFLD=1) were requested

COMDECK OUTPTD
COMMON /OUTPTD/ LPRAD, LRANG, PRAD, RANG, WL
LOGICAL LPRAD, LRANG

| SYMBOL | <u>DEFINITION</u> |
|--------|--|
| LPRAD | This logical variable is set true if total power radiated by the sources is specified by the user |
| LRANG | This logical variable is set true if computed far-zone field values are to include range factor (CEXP(-J*R)/R) |
| PRAD | Total power radiated (or input power) in watts (specified by the user) |
| RANG | The distance from the origin to the far-field point in meters |
| WL | The wavelength in meters |

```
COMDECK PARTAB
       COMMON/PARTAB/NTSKTB(100), NARGTB(1000), NDATBL(60,8),
      A NLOOPS(100,4), LITNUM(50,2), KWNAME(150), KWARG(150),
        NAMTSK(100), NCODES(250), KWBAND, KWC, KWCDP, KWCLPS
        KWCNJG, KWCNVG, KWCPNC, KWCPNM, KWC1, KWC2, KWD, KWFLID,
      D KWICOD, KWINV, KWLABL, KWLBW, KWLNLN, KWLNLG, KWLNPO, KWLGLN,
       KWLGLG, KWLGPO, KWLU, KWLUD, KWMAG, KWMXIT, KWMRG, KWN, KWOFF,
      F KWON, KWPART, KWPIVT, KWPLT, KWR, KWRDP, KWRDUC, KWRFLC.
      G KWREPL, KWR1 KWR2, KWSC, KWSCDP, KWSEQ, KWSIZE, KWSR,
      H KWSRDP, KWTRAN, KWTYPE, KWUBW, KWVALU, KWXPND, KWGEOM,
      I KWZGEN, KWEXPN, KWPLSE, KWSNCS, KWPSN, KWGDAT, KWFRQ,
      I KWZMAT, KWLOAD, KWCOND, KWEPSR, KWTRAC, KWIS,
      J NTASKS, NUMWIP, NTSKMX, NARGMX, NDATMX, LOOPMX, LITNMX,
      K KOLNAM, KOLLOC, KOLFST, KOLAST, KOLBIT, KOLROW, KOLCOL,
      L KOLLNK, KOLLBL, KOLTSK, KOLTIM, KOLCNT, KOLCOD, KOLVAL,
      M KBSNGL, KBTEXT, KBREAL, KBCPLX, KBDPRE, KBFULL, KBSYM,
      N KBBAND, KBLEFT, KBORDR, KBLWRT, KBUPRT, KBPVIT, KBGEOM, KBSRCE,
      O KBZIMP, KBSOLN, KBSYMY, KBLOAD, KBNFLD, KBFFLD, KBBITS(15).
      P NPTASK, NPARGL, NPDATA, NPLOOP, NPLITN
       COMMON /PARTAB/ KWL, KWX, KWZ, KWZIMP, KWNP, KWP1,KWP2, KWT1,
      1 KWT2, KWVS, KWX1, KWX2, KWY1, KWY2, KWZ1, KWZ2, KWECC, KWPHI,
      2 KWTAG, KWEDRV, KWFFLD, KWNFLD, KWSEGS, KWTHET, KWCW, KWSW,
      3 KWBNDW, KWMAX, KWBCSB, KWTIME, KWCHKP, KWDBUG,
      4 KWEND, KWVSRC, KWESRC, KWGMDT, KWREAD, KWLOOP, KWABS, KWRITE,
      5 KWPLOT, KWPRNT, KWPRGE, KWRSTR, KWSET, KWSOLV, KWSMDF, KWWIPE,
      6 KWZCOD, KWAXIS, KWPW, KWTAGS, KWV, MKMX, KWDM(4), NTDM. KWLMT.
      7 MXARGT, MXMAT, NARGTP(10), NARGN, NARGLM, KWFMTP(150), 8 NTSFMT(300), MXSYMB, KWTDM, KWILP,
      A KWDP, KWDR, KWDT, KWDW, KWDX, KWDY, KWDZ, KWIPE, KWPRLC, KWSRLC, KWZCDS,
      B KWZLDS, KWNMFL, KWNR, KWSTAT, KWBCRE, KWIRE, KWPRE,
      C KWSTNT, KWPR, KWPD, KWRD, KWRR, KWPL, KWER, KWED, KWCY, KWRC,
      D KWCR, KWCD, KWDC, KWPC, KWGTD, KWMM, KWEU, KWES, KWEI, KWCS, KWEC, KWPDR,
      Z KWMODL, KWINPT, KWOUTP, KWDUMY(1), LSTPAR
       DIMENSION FLTLIT(50,2)
       EQUIVALENCE(FLTLIT(1,1), LITNUM(1,1))
```

Common PARTAB contains the tables used during the parsing of the input commands. It also contains tables which are used extensively throughout the remainder of the program. This is the common which contains the table NCODES which contains the coded integer representations of key words, tasks names, symbols, and letters used in parsing the input language commands.

| CVMDOI | DEFINITION |
|--------|---|
| SYMBOL | DEFINITION |
| FLTLIT | Array containing floating point literals |
| KBBAND | Integer value of the bit indicating a banded matrix |
| KBBITS | Dummy array for future use |
| KBCPLX | Integer value of the bit which indicates complex number |
| KBDPRE | Integer value of the bit which indicates double precision number |
| KBFFLD | Integer value of bit which indicates far field |
| KBFULL | Integer value of bit which indicates a full array |
| KBGEOM | Integer value of bit which indicates geometry data |
| KBLEFT | Integer value of bit which indicates left-justi- fied alpha text |
| KBLOAD | Integer value of bit which indicates a load |
| KBLWRT | Integer value of bit which indicates lower triangular matrix |
| KBNFLD | Integer value of bit which indicates a near field |
| KBORDR | Integer value of bit which indicates order of matrix elements |
| KBPVIT | Integer value of bit which indicates a pivot matrix |
| KBREAL | Integer value of bit which indicates a real arithmetic data |
| KBSNGL | Integer value of bit which indicates a single item symbol |
| KBSOLN | Integer value of bit which indicates a solution |
| KBSRCE | Integer value of bit which indicates a source |

| SYMBOL | DEFINITION |
|--------|---|
| KBSYM | Integer value of bit which indicates a symmetric data set |
| KBSYMY | Integer value of bit which indicates a symmetric data set about the y axis |
| KBTEXT | Integer value of bit which indicates a text data set |
| KBUPRT | Integer value of bit which indicates upper triangular matrix |
| KBZIMP | Integer value of bit which indicates an inter- action matrix |
| KOLAST | The column of table NDATBL which contains the last address of the data set |
| KOLBIT | Column of NDATBL which contains the bit set information |
| KOLCNT | The integer number specifying the column of the loop table which contains the number of times the loop is still to be executed (dynamic counter). |
| KOLCOD | The number of the column in the literal table which contains the code information |
| KOLCOL | The number of the column in NDATBL which contains the number of columns of the data set |
| KOLFST | Column of NDATBL which contains the location of the first word of the data set |
| KOLLBL | The column of the loop table which contains the label the loop is to terminate on |
| KOLLNK | The column of the data table which links this data set to previous data sets |
| KOLLOC | Column in NDATBL containing the logical unit number of the file on which this symbol resides. Logical unit #0 implies core storage |
| KOLNAM | Column of NDATBL which contains the name of the data set |

| SYMBOL | DEFINITION |
|---------|---|
| KOLROW | Column of NDATBL which contains the number of rows in the data set |
| KOLTIM | Column of the loop table containing the number of times the loop is to be executed |
| KOLTSK | Column of the loop table containing the number of the task entry which references this loop |
| KOLVAL | Column of the literal table which contains the literal value |
| KWABS | Keyword for the absolute value function |
| KWARG | Array containing the number of arguments for each keyword |
| KWAXIS | Keyword for axis parameters |
| KWBAND | Pointer to the BAND keyword in the NCODES table |
| KWBCRE | Keyword pointer for BCRE |
| KWBCSB | Keyword for back substitution (BACSUB) |
| KHBNOW | Keyword for bandwidth (BNDW) |
| KWC | Pointer for the C keyword |
| KGICD | Pointer to NCODES for CD keyword |
| KMCDP | Pointer for the CDP keyword |
| KHCHKP | Keyword pointer for CHKPNT |
| KNCLPS | Pointer to the COLAPS keyword |
| KNCHJG | Pointer to the CONJG keyword |
| KNCNVG | Pointer to the CONVRG keyword |
| KWCOND | Pointer to the COND keyword |
| KWCPHC | Pointer to the CPINC keyword |
| KMCP104 | Pointer to the CPNUM keyword |
| KUCR | Pointer to NCODES for CR keyword |

SYMBOL DEFINITION

KHCS Pointer to NCODES for CS keyword

KWCW Keyword pointer for CW

KWCY Pointer to NCODES for CY keyword

KWC1 Pointer to the C1 keyword

KWC2 Pointer to the C2 keyword

KWD Pointer to the D keyword

KWDBUG Keyword pointer for DEBUG

KWDC Pointer to NCODES for DC keyword

KHDM Keyword pointer for DM

KWDP Keyword pointer for DP

KWDR Keyword pointer for DR

KMDT Keyword pointer for DT

KWDUMY Dummy array for future keyword table expansion

KNDW Keyword pointer for DW

KWDX Keyword pointer for DX

KMDY Keyword pointer for DY

KMDZ Keyword pointer for DZ

KMEC Pointer to NCODES for EC keyword

KMECC Pointer to the ECC keyword

KMED Pointer to NCODES for ED keyword

KMEDRY Pointer to the EDRV keyword

KMEI Pointer to NCODES for EI keyword

KWEND Keyword pointer for END

KNEPSR Pointer to the EPSR keyword

SYMBOL DEFINITION

KMER Pointer to NCODES for ER keyword

KWES Pointer to NCODES for ES keyword

KWESRC Keyword pointer for ESRC

KWEU Pointer to NCODES FOR EU keyword

KWEXPN Keyword pointer for EXPAND

KWFFLD Keyword pointer for FARFLD

KWFLID Keyword pointer for file ID

KWFMTP Array containing pointers to the task format

table

KWFRQ Keyword pointer for FRQ

KWGDAT Unused

KMGEOM Unused

KNGMDT Keyword pointer for GMDATA

KMGTD Pointer to NCODES for GTD keyword

KWICOD Keyword pointer for ICODE

KWILP Keyword pointer for ILP

KWINPT Pointer to NCODES for INPUT keyword

KMINV Keyword pointer for INV

KWIPE Keyword pointer for WIPE

KWIRE Keyword pointer for IRE

KWIS Keyword pointer for IS

KML Keyword pointer for L

KWLABL Keyword pointer for LABEL

KWLBW Keyword pointer for LBW

KNILGLG Keyword pointer for LOGLOG

SYMBOL DEFINITION

KWLGLN Keyword pointer for LOGLIN

KWLGPO Keyword pointer for LOGPLR

KWLMT Maximum number of keywords possible plus one

KWLNLG Keyword pointer for LINLOG

KWLNLN Keyword pointer for LINLIN

KWLNPO Keyword pointer for LINPLR

KWLOAD Keyword pointer for ZLOADS

KWLOOP Keyword pointer for LOOP

KWLU Keyword pointer for LU

KWLUD Keyword pointer for LUD

KHMAG Keyword pointer for MAG

KiMAX Current number of keywords

KINNY Pointer to NCODES for MM keyword

KHMODL Pointer to NCODES for MODULE keyword

KHMRG Keyword pointer for MERGE

KHMXIT Keyword pointer for MAXITR

KHN Keyword pointer for N

KINAME Array containing keyword pointers to the NCODES

array

KHMFLD Keyword pointer to NERFLD

KWWFL Keyword pointer for NUMFIL

KHMP Keyword pointer for NP

KIMIR Keyword pointer for NR

KMOFF Keyword pointer for OFF

KNON Keyword pointer for ON

SYMBOL DEFINITION

KHOUTP Pointer to NCODES for OUTPUT keyword

KMPART Keyword pointer for PARTN

KMPC Pointer to NCODES for PC keyword

KWPD Pointer to NCODES for PD keyword

KWPDR Pointer to NCODES for PDR keyword

KWPHI Keyword pointer for PHI

KWPIVT Keyword pointer for PIVOT

KWPL Pointer to NCODES for PL keyword

KMPLOT Keyword pointer for PLOT

KMPLSE Keyword pointer for PULSE

KWPLT Keyword pointer for PLT

KMPR Pointer to NCODES for PR keyword

KMPRE Keyword pointer for PRE

KWPRGE Keyword pointer for PURGE

KMPRLC Keyword pointer for PRLC

KMPRNT Keyword pointer for PRINT

KMPSN Keyword pointer for PSN

KMPW Not Used

KMP1 Keyword pointer for P1

KMP2 Keyword pointer for P2

KMR Keyword pointer for R

KMRC Pointer to NCODES for RC keyword

KMRO Pointer to NCODES for RD keyword

KMRDP Keyword pointer for RDP

SYMBOL DEFINITION **KWRDUC** Keyword pointer for REDUCE **KWREAD** Keyword pointer for READ Keyword pointer for REPLAC KWREPL KWRFLC Keyword pointer for REFLCT KWRITE Keyword pointer for WRITE **KWRR** Pointer to NCODES for RR keyword **KWRSTR** Keyword pointer for RESTRT Keyword pointer for R1 KWR1 KWR2 Keyword pointer for R2 **KWSC** Keyword pointer for SC Keyword pointer for SCDP KWSCDP **KWSEGS** Keyword pointer for SEGS Keyword pointer for SEQ KWSEQ Keyword pointer for SET KWSET Keyword pointer for SIZE KWSIZE Keyword pointer for SYMDEF KHSMOF Keyword pointer for SINCOS KWSNCS KHSOLV Keyword pointer for SOLVE KHSR Keyword pointer for SR Keyword pointer for SRDP KHSRDP KWSRLC Keyword pointer for SRLC Keyword pointer for STATS KWSTAT KMSTNT Keywork pointer for SETINT Keyword pointer for SW KUSU

Keyword pointer for TAG

KNTAG

SYMBOL DEFINITION

KWTAGS Keyword pointer for TAGS

KWTDM Keyword pointer for DM (direct manipulation)

KWTHET Keyword pointer for THETA

KWTIME Keyword pointer for TIME

KWTRAC Keyword pointer for TRACE

KWTRAN Keyword pointer for TRANSP

KWTYPE Keyword pointer for TYPE

KWT1 Keyword pointer for T1

KWT2 Keyword pointer for T2

KWUBW Keyword pointer for UBW

KWV Keyword pointer for V

KWVALU Keyword pointer for VALUE

KWVS Keyword pointer for VS

KHVSRC Keyword pointer for VSRC

KWWIPE Not used

KWX Keyword pointer for X

KHXPND Keyword pointer for EXPAND

KMX1 Keyword pointer for X1

KWX2 Keyword pointer for X2

KWY1 Keyword pointer for Y1

KWY2 Keyword pointer for Y2

KMZ Keyword pointer for Z

KMZCDS Keyword pointer for ZCODES

KMZCOO Not used

| INITION |
|---------|
| • |

KWZGEN Keyword pointer for ZGEN

KWZIMP Keyword pointer for ZIMP

KWZLDS Keyword pointer for ZLOADS

KWZMAT Keyword pointer for ZMATRX

KWZ1 Keyword pointer for Z1

KWZ2 Keyword pointer for Z2

LITNMX Maximum number of literal table entries

LITHUM Equivalence to FLTLIT, used to store integer

literals

LOOPMX Maximum number of loop table entries

LSTPAR Last cell of common PARTAB

MKHX Maximum number of keywords that can be packed in

one word

MXARGT Maximum number of argument types plus one

MOMATMaximum number of argument types that can be

packed into a word

MXSYMB Maximum number of operators

NAMTSK Task name pointers to NCODES table

NARGLM Number of arguments to scan for

MARGMX Maximum number of argument table entries

NARGN Number of operators

MARGTB Table containing the command language arguments

and tasks

NARGTP Array containing unpacked argument types

NCODES Table containing the encoded keywords, task

names, and all other symbols or symbolic names

used in the program

SYMBOL DEFINITION **NDATBL** Storage area for symbols and data sets **NDATMX** Maximum number of entries in NDATBL **NLOOPS** Table containing the loop information **NPARGL** Pointer to the PARSE argument list table **NPDATA** Pointer to the NDATBL array **NPLITN** Pointer to the LITNUM array **NPLOOP** Pointer to the NLOOPS array Pointer to the TASK array **NPTASK NTASKS** Number of currently implemented tasks NTDM Task number for the direct manipulation task **NTSFMT** Task format table Maximum number of tasks in TASK table NTSKMX NTSKTB Table containing task name pointers to NCODES table

Integer value of the WIPOUT task command

NUMWIP

COMDECK PATDAT

COMMON /PATDAT/ XPC(3), YPC(3), ZPC(3)

| SYMBOL | DEFINITION |
|--------|------------|
| | |

XPC This defines the pattern cut coordinate system

x axis unit vector in (XYZ) RCS components. The

x axis unit vector is given as:

XPC=x*XPC(1)+y*XPC(2)+z*XPC(3)

YPC This defines the pattern cut coordinate system

y axis unit vector in (XYZ) RCS components. The

y axis unit vector is given as:

YPC=x*YPC(1)+y*YPC(2)+z*YPC(3)

ZPC This defines the pattern cut coordinate system

z axis unit vector in (XYZ) RCS components. The

z axis unit vector is given as:

ZPC=x*ZPC(1)+y*ZPC(2)+z*ZPC(3)

COMDECK PIS

COMMON /PIS/ PI, TPI, DPR, RPD

SYMBOL DEFINITION

DPR The conversion factor for converting angular

measurements in radians to degrees (=180/PI=

57.2957795)

PI The constant PI (3.14159265)

RPD The conversion factor for converting angular

measurements in degrees to radians (=PI/180=

0.0174532925)

TPI A constant, two times PI (6.28318531)

COMDECK PLAIN COMMON /PLAIN/ XX(14,6,3)

SYMBOL

DEFINITION

XX

Array of plate corner locations in meters

COMDECK PNTTBL

COMMON/ PNTTBL / MAXPTS,NPRPT,PTTBLE(100,4),NUMPTS,IPTS,NPTBUF,
1 IPTBUF,NAMPTS,LSTPTB
DIMENSION IPTTBL (100,4)
EQUIVALENCE(IPTTBL(1,1),PTTBLE(1,1))

Common PNTTBL is used in the geometry processor and stores the locator points read in during the geometry portion of the program.

SYMBOL DEFINITION

IPTBUF Current point table buffer

IPTS Integer point number

IPTTBL Storage array for point information

LSTPTB Last cell of common PNTTBL

MAXPTS Maximum number of points that can be stored in

core at one time

NAMPTS Name of the symbol table containing the point

data on peripheral files

NPRPT The number of words per point

NPTBUF The number of times the point table has been

written to a peripheral device

NUMPTS Total number of points that have been processed

PTTBLE Equivalence to IPTTBL

COMDECK ROTRDT

COMMON /ROTRDT/ XCL(3), YCL(3), ZCL(3)

| SYMBOL | DEFINITION |
|--------|------------|
| | |

XCL This defines the reference coordinate system

x axis unit vector in global coordinate system

components.

The RCS x axis unit vector is defined as:

X=X0*XCL(1)+Y0*XCL(2)+Z0*XCL(3)

YCL This defines the reference coordinate system

y axis unit vector in global coordinate system

components.

The RCS y axis unit vector is defined as:

Y=X0*YCL(1)+Y0*YCL(2)+Z0*YCL(3)

ZCL This defines the reference coordinate system

z axis unit vector in global coordinate system

components.

The RCS z axis unit vector is defined as:

Z=X0*ZCL(1)+Y0*ZCL(2)+Z0*ZCL(3)

NOTE: XO, YO, ZO are unit vectors of the global coordinate system axes

COMDECK SAME

COMMON /SAME/ LSRCFL, LFRQFL, LGDNFL LOGICAL LSRCFL, LFRQFL, LGDNFL

DEFINITION SYMBOL

LFRQFL Logical variable flag to indicate if the fre-

quency is the same (LFRQFL=TRUE) or is different (LFRQFL=FALSE) from the previous time GTD cal-

culations were performed

Logical variable flag to indicate if the geometry data set name is the same (LGDNFLstTRUE) LGDNFL

or different (LGDNFL=FALSE) from the previous

time GTD calculations were performed

Logical variable flag to indicate if the source location or type is the same (LSRCFL=TRUE) or **LSRCFL**

different (LSRCFL=FALSE) from the previous time

GTD calculations were performed

COMDECK SCNPAR

SYMBOL

IPER

COMMON /SCNPAR/ NCODE(256), NVAL(256), NCARD(81), LETR(26),

IDIG(10), JDIG(10), ISYMBL(11), NARG(10), NF(10), NARGT(10),

NLETR, NDIGIT, NARITH, NCOMMA, NPAREN, NBLANK, NPEROD, NINT, NFRAC, MATCH, NOMTCH, NDTASK, IGNORE, NEOFLG,

MXCDFG, NFINCD, NDEBUG, NRESTF, NRDCDF,

IPER, ICOMMA, IPLUS, IMINUS, ISTAR, ISLASH, IEQUAL,

ILEFT, IRIGHT, IBLANK, IDOLAR,

NVALMX, MXINCT, MXFPCT, MXDPCT, MXANCT, MXEXPD, MXEXFP,

NPRSER, IPSTSK, IPSARG, IPSDAT, IPSLIT, IPSLOO, LSTDAT, LSTINT, LSTASK, LSTINP, INTVAL, LSTFNC,

DEFINITION

NARGS, KBINTP, KCHKPT, KRSTRT, KINPUT, KOUTPT, KSYMDF,

NSCNER, NCOL, NCHAR, NCCLAS, NDIG, NTAB, NCARÓS, LSTCÓL.

NCOMCH, NCONCH, NCON, NCON1, NENDCD, MAXCDS, NCOM, NTASK,

) NSCOL, NCCARD, LCHAR DIMENSION VAL(256)

EQUIVALENCE (NVAL(1), VAL(1))

Common SCNPAR is used in scanning and parsing the command language input.

| IBLANK | Integer pointer to blank symbol in ISYMBL array |
|--------|--|
| ICOMMA | Integer pointer to comma symbol in ISYMBL array |
| IDIG | Array containing the integers 0 through 9 |
| IDOLAR | Pointer to the dollar symbol in the ISYMBL array |
| IEQUAL | Pointer to the equal symbol in the ISYMBL array |
| IGNORE | Flag indicating ignore blanks in the input field |
| ILEFT | Pointer to left parenthesis symbol in ISYMBL table |
| IMINUS | Pointer to the minus symbol in the ISYMBL table |
| INTVAL | Initial value of the parameters on an input card |
| | |

ISYMBL array.

Pointer to the radix or period symbol in the

IPLUS Pointer to the plus symbol in the ISYMBL array

IPSARG Pointer to the parse argument

| SYMBOL | DEFINITION |
|--------|---|
| IPSDAT | Pointer to the parse data |
| IPSLIT | Pointer to the parse literal table |
| IPSL00 | Pointer to the parse loop table |
| IPSTSK | Pointer to the parse task table |
| IRIGHT | Pointer to the right parenthesis in the ISYMBL array |
| ISLASH | Pointer to the slash symbol in the ISYMBL array |
| ISTAR | Pointer to the star symbol in the ISYMBL array |
| ISYMBL | Array containing the special symbols that are allowed in the code |
| JDIG | Array containing the hollerith integer 0 through 9 |
| KBINTP | Integer number of BINTAP task |
| KCHKPT | Integer number of CHKPNT task |
| KINPUT | Integer number of INPUT task |
| KOUTPT | Integer number of OUTPUT task |
| KRSTRT | Integer number of RESTRT task |
| KSYMDF | Integer number of SYMDEF task |
| LCHAR | Current character being scanned on the control card |
| LETR | Array containing Hollerith alphabet letters |
| LSTASK | Flag indicating a list of task names to be parsed |
| LSTCOL | The last column of the command data card to be processed, default is 80 |
| LSTDAT | Flag indicating that a list of existing data sets is to be parsed |

| SYMBOL | DEFINITION |
|--------|--|
| LSTFNC | Keyword ordinal for last function entered |
| LSTINP | Request to parse a concentrated list of input integers |
| LSTINT | Processed list of input integers |
| MATCH | Requested symbol must match previous entry in NDATBL |
| MAXCDS | Maximum number of cards |
| MXANCT | The maximum number of characters for a variable |
| MXCDFG | The maximum number of cards read |
| MXDPCT | The maximum floating point significance for a double precision number |
| MXEXFP | The maximum floating point exponent for a given machine |
| MXEXPD | The maximum double precision exponent for a given machine |
| MXFPCT | The maximum floating point significance for single precision variables |
| MXINCT | The maximum integer character width for a given machine |
| NARG | Array containing the argument locations in NARGTB |
| NARGS | The number of arguments expected for a command |
| NARGT | Array containing the type of argument to be provided |
| NARITH | Pointer indicates that an arithmetic operation is expected |
| NBLANK | Code type for a blank field on the input card |
| NCARD | The command card array |
| NCARDS | Current statement number |

| SYMBOL | DEFINITION |
|--------|---|
| | |
| NCCARD | Continuation card number |
| NCCLAS | Character class of the last character retrieved by subroutine GETCHR |
| NCHAR | Last character retrieved by subroutine GETCHR |
| NCODE | Table of codes to the parsing routines by the scanner |
| NCOL | Next column to be retrieved by subroutine GETCHR |
| NCOM | Column containing the comment character, default to column $\boldsymbol{1}$ |
| NCOMCH | The comment character, default to \$ |
| NCOMMA | Integer code for a comma |
| NCON | Column containing the continuation character, default to $\boldsymbol{1}$ |
| NCONCH | The continuation card character, default to * |
| NCON1 | Column to resume scanning the command on a continuation card, default to 2 |
| NDEBUG | Flag turned on when a DEBUG statement is being scanned |
| NDIG | The value of the digit if the character being read is a digit |
| NDIGIT | Integer specifying a digit character |
| NOTASK | Integer value identifying a task code |
| NENDCD | The end-of-card character |
| NEOFLG | End-of-file flag returned by READCD |
| NF | Array of argument-found flags for subroutine STRARG |
| NFINCD | The flag turned on when the END card was read |

| <u> JOBMYZ</u> | DEFINITION |
|----------------|--|
| NFRAC | Pointer to the fractional part of a floating point number |
| NINT | Pointer to an integer or the integer part of a floating point number |
| NLETR | Pointer to the LETR array |
| NOMTCH | Flag turned on when no-match is required for previous NDATBL entries |
| NPAREN | Flag to indicate that the current field is a parenthesis |
| NPEROD | Flag to indicate that the current field is a period |
| NPRSER | Flag turned on when error has occurred in the parse subroutines |
| NRDCDF | Flag to indicate a continuation card |
| NRESTF | Flag to indicate a restart |
| NSCNER | Flag turned on when a scan error has occurred |
| NSCOL | The card column at the beginning of field being scanned |
| NTAB | Index to the NCODE and NVAL arrays |
| NTASK | Current task name ordinal |
| NVAL | A table of associated values with respect to the NCODE array |
| NVALMX | The maximum number of entries in the NCODE or NVAL tables |
| VAL | Equivalence to the NVAL array for floating point values |

COMDECK SDATA

DATA NUMSUB, LSAVE(1), LSAVE(2), LSAVE(3), LSAVE(4), LSAVE(5)/6*0/

 $\begin{array}{c} \textbf{Common deck SDATA is used for initializing internal variables used to} \\ \textbf{save subroutine information} \\ \end{array}$

SYMBOL DEFINITION

LSAVE Array used to save subroutine information

NUMSUB Subroutine number

COMDECK SEGMNT

COMMON/SEGMNT/SEGTBL(11,500), MAXSEG, NPRSEG, NUMSEG, ISEG, MAXBLK

1 ,SCALE, NAMSEG, MAXRAD, RAD(10), JCBIAS, JBIAS1, JBIAS2, NYRSYM, MLTJCT

2 ,NRAD,NDXBLK,UPDBLK,NWIRE,NPATCH,GAREA,PAREA,JBIAS3

DIMENSION ISGTBL(11,599)
EQUIVALENCE (ISGTBL(1,1), SEGTBL(1,1))

LOGICAL UPDBLK

Common SEGMNT contains the wire segment information and is used in the geometry driver, the interaction matrix generator, and will also be used as a scratch area in the lower/upper decomposition driving routine.

| SYMBOL | DEFINITION |
|--------|--|
| GAREA | Total surface area of wire segments |
| ISEG | Pointer to the current segment number |
| ISGTBL | Array containing the segment information |
| JBIAS1 | Integer to bias connection data to end one of the segment |
| JBIAS2 | Integer to bias connection data for end two of a segment |
| JBIAS3 | Integer to indicate connection of a wire segment to a patch |
| JCBIAS | Integer to indicate multiple junction connection |
| MAXBLK | Total number of geometry data blocks |
| MAXRAD | Maximum number of radius entries |
| MAXSEG | Maximum number of segment entries that can be stored in core |
| MLTJCT | Flag to indicate a multiple junction has been found |
| NAMSEG | The name of the segment table when it is written out of core |
| NDXBLK | Index to the current geometry data block |
| NPATCH | Total number of patches |
| NPRSEG | Number of data entries per segment |

SEGMNT

SYMBOL **DEFINITION**

NRAD Number of radius entries

NUMSEG Number of segments which have been processed

NWIRE Total number of wire segments

NYRSYM Flag to indicate wire symmetry

PAREA Total surface patch area

RAD Array of radii values

SCALE Scale factor to be used in processing geometry

input

SEGTBL Equivalence to table ISGTBL

Flag set .TRUE. when the data in the current geometry block have been updated since the last time the block was stored on a file **UPDBLK**

COMDECK SORINF

COMMON /SORINF/ XS(3), VXS(3,3)

SYMBOL

DEFINITION

VXS

A 3X3 matrix defining the source coordinate system axes unit vectors in reference coordinate system components:

XP=x*VXS(1,1)+y*VXS(1,2)+z*VXS(1,3)

YP=x*VXS(2,1)+y*VXS(2,2)+z*VXS(2,3)

 $\angle P = x * VXS(3,1) + y * VXS(3,2) + z * VXS(3,3)$

XS

The location of the source in (XYZ) reference coordinate system components in wavelengths

COMDECK SOURSF COMMON /SOURSF/ FACTOR

SYMBOL

DEFINITION

FACTOR

This is a coefficient of the source field used to obtain the correct field magnitude for sources mounted on plates or end caps (in order to compensate for image effects). Factor is given as follows:

For Electric Sources:

For source not mounted on plate or end cap, FACTOR=1.0

for source mounted normal to plate or end cap,

FACTOR=1.0

For source mounted on plate or end cap but not normal to it.

FACTOR=0.5

For Magnetic Sources*:

For source not mounted on plate or end cap, FACTOR=1.0

For source mounted on plate or end cap and parallel to it,

FACTOR=2.0

For source mounted on plate or end cap, but not parallel to it,

FACTOR= 1.0

^{*}Magnetic sources are not included in version 3 of GEMACS.

COMDECK SRC COMMON /SRC/ SP1, SP2, IM

| SYMBOL | DEFINITION |
|--------|--|
| IM | The source type |
| SP1 | The wire source radius in wavelengths; or the patch area in square wavelengths |
| SP2 | The wire source length in wavelengths; or for patches it is zero |

COMDECK SRFACC

COMMON /SRFACC/ LSRFC(2) LOGICAL LSRFC

SYMBOL

DEFINITION

LSRFC

A logical variable indicating whether or not the source under consideration is mounted on cylin-

der end cap MC

LSRFC(MC)=T indicates source mounted on end cap

MC

LSRFC(MC)=F indicates source not mounted on end

cap MC

COMDECK SURFAC

COMMON /SURFAC/ LSURF(14) LOGICAL LSURF

SYMBOL

DEFINITION

LSURF

A logical variable indicating whether or not the source under consideration is mounted on plate

MP

LSURF(MP)=T indicates source mounted on plate MP LSURF(MP)=F indicates source not mounted on plate MP COMDECK SYMSTR

COMMON/SYMSTR/FLTSYM(100), NXTSYM, MAXSTR DIMENSION INTSYM(100) EQUIVALENCE (INTSYM(1), FLTSYM(1))

Common SYMSTR is used to store single variables.

SYMBOL DEFINITION

FLTSYM Array containing all single variables

INTSYM Integer array equivalenced to FLTSYM

MAXSTR Maximum number of entries that can be entered in

FLTSYM

NXTSYM Next available entry in the FLTSYM array

COMDECK SYSFIL

COMMON/ SYSFIL /CHKPNT, IOCKPT, RSTART, CPFRWD, TIMTGO, NUMCHK, INCCHK,

B IOSYMB, IOSCR1, IOSCR2,

C IOTASK, CHKWRT, D MODCHK, RSTRTA, COMPLT, LSTTPF,

Z LSTSYS(20)

DIMENSION SYSLST(20) LOGICAL RSTRTA, COMPLT

EQUIVALENCE (SYSLST(1), LSTSYS(1)) LOGICAL CHKPNT, RSTART, CHKWRT, CPFRWD

Common SYSFIL contains information for the interface between the GEMACS program and the host computer system. In addition, it contains the checkpoint and binary output information.

| SYMBOL | DEFINITION |
|--------|--|
| CHKPNT | Logical variable equals true when checkpoint tape is to be written |
| CHKWRT | Logical variable equals true when checkpoint is being written |
| COMPLT | Run complete flag |
| CPFRWD | Logical variable equals true when checkpoint tape is to be rewound |
| INCCHK | Checkpoint interval increment in CP minutes |
| IOCKPT | Logical unit for checkpoint output |
| IOSCR1 | Logical unit for scratch file #1 |
| IOSCR2 | Logical unit for scratch file #2 |
| IOSYMB | Logical unit for storing symbols |
| IOTASK | Logical unit on which command language input is found |
| LSTSYS | Last cell of SYSFIL common |
| LSTTPF | Pointer to last task executed |
| MODCHK | Logical unit for end-of-module checkpoint file |
| NUMCHK | Number of checkpoints written |
| RSTART | Logical variable equals true when checkpoint |

restart has been accomplished

SYSFIL

SYMBOL

RSTRTA

Alternate restart flag

SYSLST

Floating point array equivalenced to LSTSYS

TIMTGO

Total run time requested on TIME command

COMDECK TEST

COMMON /TEST/ LDEBUG, LTEST LOGICAL LDEBUG, LTEST

SYMBOL DEFINITION

This logical variable is set true if debug data are to be printed to file LUPRNT LDEBUG

This logical variable is set true if test data are to be printed on line printer (not used in **LTEST**

version 3 of GEMACS)

COMDECK THPHUV

COMMON /THPHUV/ DT(3), DP(2)

SYMBOL

DEFINITION

DP

The phi unit vector for observation direction $\ensuremath{\mathsf{D}}$ in reference coordinate system components:

 $DP = \hat{x}*DP(1)+\hat{y}*DP(2)$

DT

The theta unit vector for observation direction D in reference coordinate system components:

 $DT = \hat{x} * DT(1) + \hat{y} * DT(2) + \hat{z} * DT(3)$

COMDECK TEMPO1

COMMON/TEMPO1/TEMP(5500),NTEMPS,LSTTMP DIMENSION ITEMP(5500) EQUIVALENCE (ITEMP(1), TEMP(1))

SYMBOL DEFINITION

ITEMP Array of integer variables equivalent to TEMP

LSTTMP Last cell of the TEMPO1 array

Number of cells of the TEMP array **NTEMPS**

Floating point equivalence to ITEMP **TEMP**

COMDECK TMI
COMMON/TMI/ZPK,RHK,RKB2,IJ,IPATCH

| SYMBOL | DEFINITION |
|--------|---|
| IJ | Flag for numerical integration; IJ=O indicates self-interaction |
| IPATCH | Flag indicating a patch observation point |
| RHK | $k\rho_{\bullet}$ where ρ_{\bullet} is the distance between the observation point and the axis of the source wire segment |
| RKB2 | $\left(k\rho'\right)^2$, where ρ' is the distance between the observation point and the side of the source wire segment (see subroutine TNEFLD, figure 2) |
| ZPK | Wave number times the polar z coordinate of the obser- vation point |

COMDECK TOPD COMMON /TOPD/ TOP COMPLEX TOP

SYMBOL

DEFINITION

TOP

The complex constant, $\sim CEXP(-J*PI/4.)$

COMDECK XSTR1 COMMON /XSTR1/ XSS(3),TRO(3),VXSS(3,3)

| SYMBOL | DEFINITION |
|--------|---|
| TRO | The location of the cylinder center in meters |
| VXSS | The source axes unit vectors in the global coordinate system |
| xss | The source location in meters in the global coordinate system |

MISSION

MISSION of Rome Air Development Center

RADC plans and executes research, development, test and selected acquisition programs in support of Command, Control Communications and Intelligence $\{C^3I\}$ activities. Technical and engineering support within areas of technical competence is provided to ESD Program Offices $\{POs\}$ and other ESD elements. The principal technical mission areas are communications, electromagnetic guidance and control, surveillance of ground and aerospace objects, intelligence data collection and handling, information system technology, ionospheric propagation, solid state sciences, microwave physics and electronic reliability, maintainability and compatibility.

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